MacWEEK

05.10.93 Volume 7 Number 19 THE NEWSWEEKLY FOR MACINTOSH MANAGERS

MacWEEK/ZD Labs Report

Network Operating Systems

In Reviews

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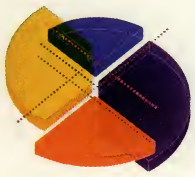
VITAL virtual no longer as Apple delivers volumes

By Stephen Howard

San Antonio, Texas — Apple last week released the rules and concepts behind its client-server architecture, VITAL.



VITAL

The $1,500 VITAL Technical Architecture Guides, or TAGs, are the result of Apple's own in-house development. At the MacIS conference here, the company shipped Version 3.0, the first public release of the TAGs, which fills more than 1,000 pages.

Lani Spund, chief technologist and architect in Apple's Enterprise Systems Division and the father of VITAL, said, "You might want to think of TAG 3.0 as 'Inside Enterprise Systems,' " referring to Inside Macintosh, Apple's voluminous reference work that describes how to program the Mac.

"It's not light reading," said Jeri Crittenden, director of Enterprise Systems Division strategy and operations at Apple.

In Apple's top-down model, VITAL is a "technical architecture" that sits above the actual software tools used in information systems. In fact, the TAGs do not specify partic-

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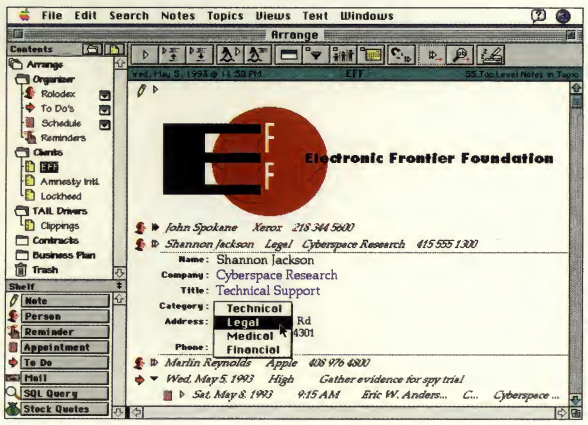


Common Knowledge's Arrange, a customizable information environment, will be showcased at this week's Worldwide Developers Conference.

New way to Arrange info

By Henry Norr

Palo Alto, Calif. — A new "information environment" that combines the benefits of free-form text storage, structured database views and outline-style organization with automated import from other applications will be among the third-party programs Apple will showcase at this week's Worldwide Developers Conference.

Developed by a start-up company called Common Knowledge Inc., the program has been code-named Tesla during more than three years of development, but it will be dubbed Arrange when released this summer, sources said. A Windows version is also under development, but a release date has not been set, sources said.

The program is designed to offer

See Arrange, Page 107

NEWSPAPER SECOND CLASS

Apple plans help for help desks

Support program aimed at large sites

By Leonard Heymann

Cupertino, Calif. — Apple this fall is expected to roll out an ambitious technical-support program designed to impart Macintosh wisdom to corporate help desk staffs.

The forthcoming Support Professional Program includes a CD-ROM-based database and priority telephone access to help users troubleshoot problems, as well as desktop technical briefings and training, sources said.

With the new suite of products and services, Apple will stress its ability to provide strategic support to large sites in tandem with the tactical support it offers under the new Apple Assurance program, which offers on-site service and toll-free telephone support.

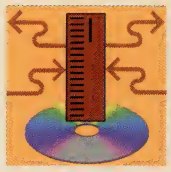
Apple declined to comment other than to stress that the program is still being defined and will be announced later this year.

The Support Professional Program is expected to include:

- **Support automation system.** A client-server system will let users access a CD-ROM database containing Apple manuals, software archives and installer scripts using AppleSearch, Apple's recently announced text-retrieval tool. Users will also receive via AppleLink updates that address current problems such as viruses.
- **Technical backup.** Support

See Help desk, Page 108

Apple's Support Professional Program



On-site automated support
CD-ROM database accessible via AppleSearch.

Desktop briefings
Briefings include QuickTime movies. Conference calls answer follow-up questions and introduce new products.

Technical backup
Priority telephone assistance; options include extended hours and dedicated account engineers.

Training
Courses designed specifically for IS professionals.

APIs jumping across platforms

Sun aims to open Windows standard

By Robert Hess

News Analysis

The process used to be simple: By selecting among the Macintosh, Intel-Microsoft or Unix platforms, you defined not only your hardware and operating-system options but also the look and feel of your desktop and applications. Users demanded cross-platform data-interchange and networking capabilities but didn't expect applications written for one OS to run on another platform.

Now a spate of recent announcements from OS developers shows that that model is on the verge of disintegration. With OS vendors who previously targeted a single-processor platform scrambling to expand the market for their application programming interfaces (APIs), users may soon get to choose the OS, graphical user interface and applications they wish to use independent from the hardware architecture they select.

Apple, after pooh-poohing the idea of bringing its system software to other platforms, is now racing to bring the Mac look and feel to other manufacturers' hardware, starting with the tens of millions of Intel-based PCs, through a new series of products to be called Companion (see MacWEEK, April 26). With time, Apple is expected to broaden Companion's scope to a number of RISC platforms and Unix systems.

But Apple is not alone in seeking to put its API on a wider range of platforms. Microsoft Corp. last week denied published reports that it is planning to port Windows to the Mac but made a pair of announcements that could in different ways narrow the gap between the two systems: a collection of C and C++ developers tools designed

See Cross platform, Page 107

Adobe queues up high-end features for Premiere 3.0

By Neil McManus

Mountain View, Calif. — Adobe Systems Inc. reportedly is preparing Adobe Premiere 3.0, a new version of the QuickTime editing application that will add high-end features aimed at video professionals.

The new version is expected to be announced at next month's Digital World '93 conference in Beverly Hills, Calif. According to sources, new features will include:

- **Unlimited layers.** Users will be able to overlay as many video tracks as they want and render them in one pass. This will let users create effects quickly, such as an animation sweeping in from the left side of a movie as type moves in from the right.
- **Better performance.** The new version will be significantly faster, sources said. A preview that might

See Premiere, Page 108

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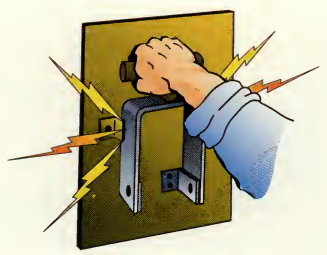

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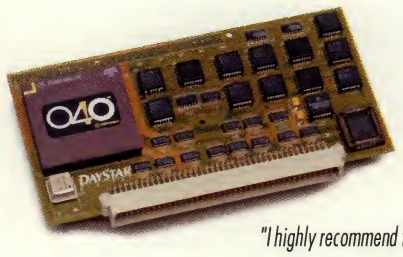

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**Mac IIci and IIsi are now available. Mac II, IIx, IIcx, SE/30, IIvi, IIvx and Performa 600 have limited availability thru July, 1993*

Apple-Microsoft legal battle headed for trial next month

By Jon Swartz

San Francisco — Even though Apple's ongoing copyright-infringement battle with Microsoft Corp. and Hewlett-Packard Co. is nearing a trial date, most legal experts say they don't see an end in sight to the case.

U.S. District Judge Vaughn Walker last week set a June 28 trial date for the 5-year-old case. A pretrial hearing has been scheduled here for either June 1 or 2.

Last week's hearing was devoted mostly to arguments from Microsoft and HP attorneys in support of their pending motions for summary judgments.

"This is turning into a very different case than what Apple had intended," said Jonathan Rosenoer, a San Mateo, Calif.-based lawyer who specializes in intellectual property. "But Apple won't give up easily. There are too many important issues involved. This case will go on for years."

Last month, Walker reduced to three the number of individual Windows interface items remaining in dispute. Apple originally claimed that more than 200 Windows features infringed on Apple copyrights. □

Apple to issue ARA site licenses

By Leonard Heymann

Cupertino, Calif. — Apple this week finally will respond to the clamor among Mac users for AppleTalk Remote Access site licenses by adding the product to its fledgling software licensing program.

AppleTalk Remote Access (ARA) will be available through resellers participating in Apple's Software Volume Licensing Program, under which users purchase licenses granting them the right to duplicate System 7.1 and other selected Apple software, according to Lisa Jones, program manager for channel development at Apple.

Since last fall, when the dial-up networking tool was unbundled from the PowerBooks, Apple has sold ARA only in a $199 single-user license package that acts as both a server and a client and can be used on no more than three CPUs. Pricing for the ARA licenses, which will be offered in six tiers for 50 to 2,499 users, was still not set as of last week.

Sources said Apple will bundle a client-only version of ARA with some PowerBook models starting as soon as next month.

Apple is also expanding the site licensing program with the addition of four more resellers, Jones said. The four are Corporate Software Inc. of Canton, Mass.; Egghead Software Inc. of Issaquah, Wash.; Softmart Inc. of Exton, Pa.; and Software Spectrum Inc. of Garland, Texas. The quartet join MacWarehouse, The MacZone, Mac's Place and CompUSA Inc. (see MacWEEK, April 19).

Jones said other resellers will likely be added to the licensing program, which is still being fine-tuned. □

Developers on the way to San Jose

By Henry Norr

San Jose, Calif. — PowerPC, Newton, QuickDraw GX and Bedrock are among the technologies topping the agenda this week as more than 3,000 developers gather here for the annual Apple Worldwide Developers Conference.

An array of major developers will reportedly line up to declare their commitment to producing native-mode applications for the PowerPC. Sources said Apple is likely to demonstrate a Mac system using a version of the new RISC chip running at about 80 MHz; only 50- and 66-MHz versions had been announced previously.

Echo Logic Inc. of Holmdel, N.J., will show a range of applications being ported with its FlashPort 680x0-to-PowerPC software translation technology and disclose that Apple's Enterprise Systems Division is using the system in the development of PowerOpen.

A CD-ROM to be distributed to attendees will include the first prerelease version of QuickDraw GX, an updated beta of AOCE (Apple Open Collaboration Environment), prerelease text-to-speech software and the shipping version of AppleScript.

The company is also expected to roll out SCSI Manager 4.3, which will finally bring asynchronous I/O to the top of the Mac line.

Apple reportedly won't be talking in public about its plans to take the Mac look and feel cross-platform under the Companion rubric, but cross-platform development tools such as Symantec Corp.'s Bedrock application framework will be a major focus of the sessions. □

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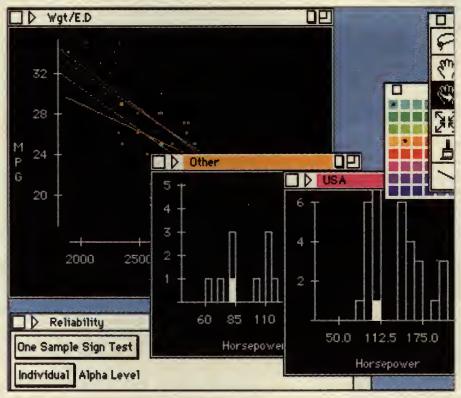

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Omnis system makes sharing code easier

Code objects can be reused for projects

By Robert Hess

San Francisco — Blyth Software Inc. demonstrated Omnis 7^2, a new package that adds code-management facilities to the company's Omnis 7 database development system, at last week's DB/Expo '93 here.

The new package will include a Version Control System (VCS), offering teams of programmers a set of tools to make sharing and reuse of code easier. With VCS, developers can create code objects, contribute them to common libraries and share their functionality with other developers. Objects can be standardized within a company and reused for different projects.

A new Change Management System will make it easier to distribute changed code to users, the company said. Application modules are stored as a series of linked objects; when users connect to the application, their copies of these objects are updated if necessary.

Omnis 7^2 includes software to access SQL data from Oracle, Sybase, RdB, DB2, Informix, SQLServer and legacy databases. It supports Apple's Data Access Language and Microsoft Corp.'s Open Database Connectivity.

Omnis 7^2 is due this summer for $3,750 ($3,000 through Sept. 1). Upgrades are $500 and up, depending on the version and quantity.

Blyth Software Inc. is at 1065 E. Hillsdale Blvd., Suite 300, Foster City, Calif. 94404. Phone (415) 571-0222; fax (415) 571-1132. □

ANDYNE CREATES COLORFUL DEBUT FOR PABLO

Bringing an unusual touch of high culture to last week's DB/Expo '93 in San Francisco, Andyne Computing Ltd. decorated its booth with original works by Pablo Picasso. The occasion was the formal introduction of Pablo, a new $695 package designed for retrieval and presentation of summary information from corporate databases (see MacWEEK, April 12). The program was originally developed by Apple for its own internal use, under the name Picasso (see MacWEEK, Feb. 12, 1991). Andyne, which has taken over development and support of the program, expects to ship its version in September. For more DB/Expo news, see Page 18.

Helix Tracker package keeps work flow moving

By Lisa Picarille

Northbrook, Ill. — Helix Technologies last month shipped Helix Tracker, its Mac work-flow and document-management system.

Tracker, originally due last October, is the first in a series of promised work-flow-management applications that rely on the company's Helix Express database (see MacWEEK, Aug. 3, 1992).

Tracker uses a routing-slip metaphor, in which users send documents stored in the database along predetermined paths within a workgroup. A task, consisting of a set of due dates, instructions and documents, is delivered in sequence to each employee who needs to work on the project. Users can also return documents back to previous users if further work is required.

The user who creates a task can check its status, reroute it or notify others when changes are needed. Users can see upcoming tasks and plan their schedules accordingly.

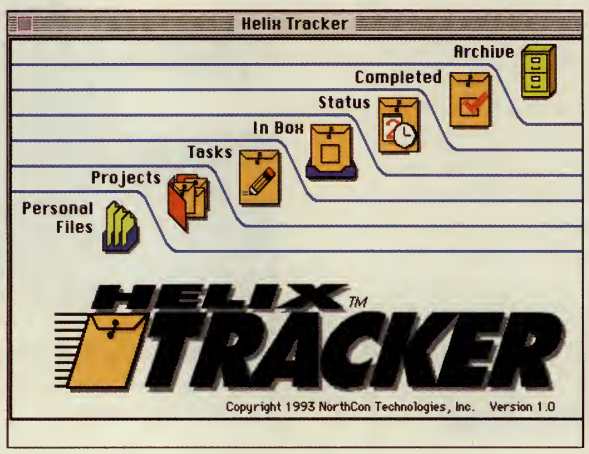
The program maintains an audit trail for each task, adding the name of the user and a time stamp each time a task is moved. Tracker users can annotate documents and store and retrieve documents in shared or private "filing cabinets."

The package, including a server and four clients, will list for $439, but Helix is offering it for $99 this month only. Additional Tracker clients sell for $135 to $199, depending on quantity.

The company also shipped last month a bug-fix upgrade for Helix Express. Version 1.0.1 improves performance and fixes memory-allocation bugs present in both the client and server applications.

Current users can download an updater from on-line services for free, or obtain the upgrade directly from Helix for $25.

Helix Technologies, a subsidiary of Albara Corp. of Conroe, Texas, is at 4100 Commercial Ave., Northbrook, Ill. 60062. Phone (708) 205-1669 or (800) 364-4359; fax (708) 291-7091. □



Helix Tracker is a work-flow-automation application that lets users route documents along predetermined paths through workgroups, annotate documents, and store and retrieve them in filing cabinets.

Business Objects brings to Mac Windows graphical query tool

By April Streeter

San Francisco — Business Objects Inc. next month will release a Macintosh version of a Windows graphical query tool that shelters end users from having to learn the complexities of the SQL query language.

BusinessObjects, which the company rolled out at DB/Expo '93 here, lets database administrators set up for each end user a series of "objects" that represent SQL definitions used to construct queries.

Objects are grouped together in what the company calls a universe. A database administrator uses the program's graphical interface to specify relationships between SQL database tables by creating "joins" between objects.

The server software includes an inference engine that keeps track of and determines the correct joins between complex objects for all clients.

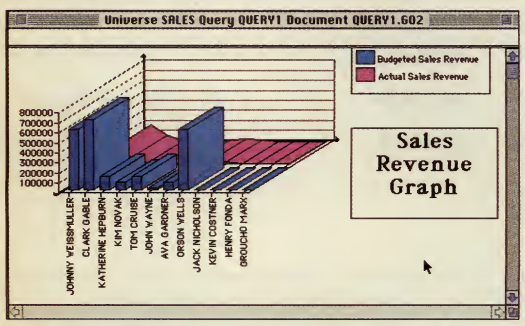
Users point and click to select objects to include in a query. Once a query has been executed, the program can generate reports and graphs, which can be formatted by users.

A special button lets users publish gathered query data that they plan to subscribe to from another application.

The initial Mac version, to be priced at $595 per client and $3,495 for the server software, will support access to databases from Oracle Corp., Sybase Corp., Ingres Inc., Informix Inc. and Digital Equipment Corp. through Sybase's Open Client and Oracle's SQL*Net middleware programs.

The company said a version of the program planned for next year will support Apple's Data Access Language.

Business Objects Inc. is at 2500 Sand Hill Road, Suite 240, Menlo Park, Calif. 94025. Phone (415) 854-1500; fax (415) 854-4737. □



Business Objects will port its Windows-based query tool to the Macintosh. The program, called BusinessObjects, lets administrators translate SQL queries into objects that users manipulate without the need to learn SQL.

Apple offers kits for multimedia development

By Neil McManus

Cupertino, Calif. — Apple last week announced a series of tool kits for users who want to get started in Mac and cross-platform multimedia development.

The first two kits, due this month, will offer tools for electronic book publishing; a third package will offer Apple-created authoring tools for cross-platform multimedia titles.

▸ **Electronic books.** The Author's Solution for Interactive Electronic Books will come in two versions. The Level I Kit, priced at $125, includes MediaText, an authoring program from Wings for Learning/ Sunburst of Pleasantville, N.Y. MediaText lets users combine text, graphics, sound and QuickTime movies into interactive documents.

The Level II Kit, priced at $350, will come with HyperCard 2.1 and Expanded Book Toolkit from The Voyager Company of Santa Monica, Calif. This package creates interactive books with all the media types of the Level I kit, and it includes automated word-search and annotation features.

▸ **Cross-platform.** The Apple Media Kit, due this summer, will include tools for authoring multimedia titles for the Mac, Windows and upcoming consumer devices from the Apple Personal Interactive Electronics division.

The kit will be centered around a new Apple-developed application that will let users graphically author cross-platform titles without scripting, according to Duncan Kennedy, Apple product line manager for multimedia software tools.

The as-yet-unnamed program, which will also be sold separately, will produce self-running titles for the Mac and Windows. It will also support Kaleida Labs Inc.'s ScriptX and the PIE consumer devices. The application will include an object-oriented programming environment.

Users can order the book kits through APDA at (716) 871-6555 or (800) 282-2732. □

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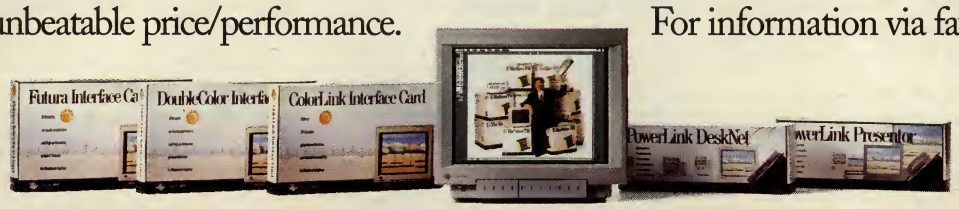

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Data Desk gets new analysis options

Version 4.1 adds speed, color control

By Raines Cohen

Ithaca, N.Y. — Data Description Inc. this month will ship an upgrade of its statistical application. The company said Data Desk 4.1 is easier to use, faster and more powerful than earlier versions.

The $595 program combines traditional statistics functions with exploratory data analysis and graphics to help users discover and understand patterns in data.

New features include:

▸ **Notebooks.** Users can record the history of a data analysis, including comments, plots, tables, time stamps and links to original analyses. New tools let users edit text and manipulate pictures more easily and extensively than before.

▸ **HotSets.** Version 4.1 users can define subsets of cases on the fly, based on the color or symbol assigned to a point or whether it is selected. This lets users quickly focus on alternative sets of cases for comparison and consistency analysis.

▸ **New tests and diagnostics.** Version 4.1 adds several nonparametric test procedures, including the Sign test, Paired Sign test, Mann-Whitney U test and the Wilcoxon Signed Rank test. Users can choose to include and exclude ties. Also added are a measure of Hadi's Influence and Potential-Residual plots for regression analyses. Both help users identify outliers and influential subgroups.

▸ **Dynamic lagging.** Users can now drag a slide control to specify a lag interval between variable sets in time series data. This feature lets users build interactive autocorrelation analyses.

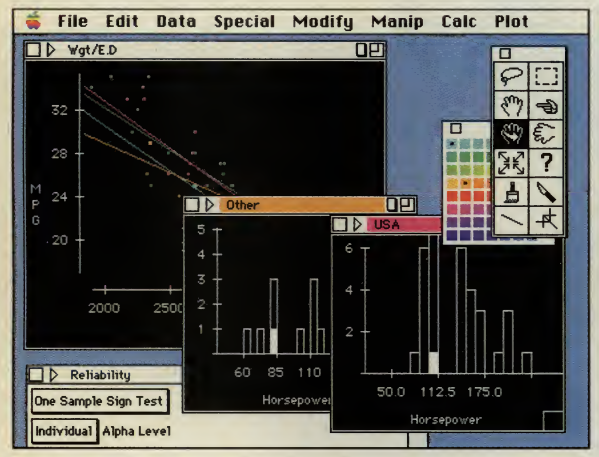
Other enhancements include improved plotting, user control over color palettes and multipage layout windows.

"Without Data Desk, it would have been physically impossible to do a number of the studies we have done," said Chuck Vavra, senior principal reservoir geologist with Arco Exploration Production Technology, a division of Atlantic-Richfield Co. in Plano, Texas. "The interface allows you to tear through masses of data." Vavra uses the program to analyze geophysical data in oil exploration.

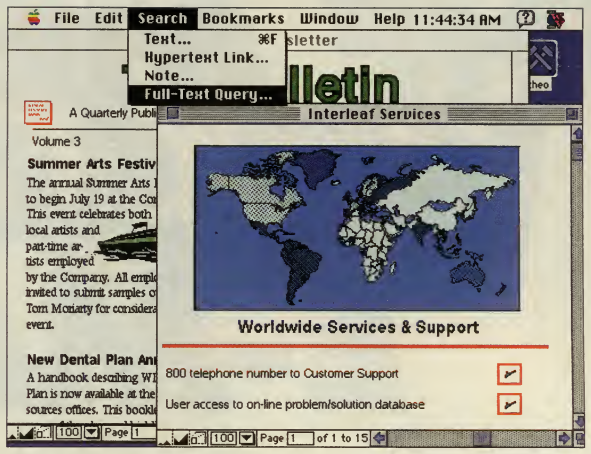
"The new version is really slick," he said. "The speed is improved a lot. The new general linear model is nice. [The] hot-selector … lets me look at wells of different depths and in different zones and quickly see the relationships."

Upgrades from 4.0 are free.

Data Description Inc. is at P.O. Box 4555, Ithaca, N.Y. 14852. Phone (607) 257-1000; fax (607) 257-4146. □



Data Desk 4.1 lets users control color palettes, display information for selected points as the plot rotates and perform new nonparametric tests.



Interleaf's WorldView 2 electronic document distribution software will add support for color, letting users view color graphics and text. Other new features add support for SGML, "intuitive" searches and redlining.

WorldView upgrade will include SGML support, outline navigator

By Carolyn Said

Waltham, Mass. — Interleaf Inc. last month announced plans to add support for SGML in the next release of its WorldView electronic document distribution software.

WorldView 2, due by the end of the year, will support input, search and output of Standard Generalized Markup Language, a method for defining document structures. Users will be able to search for information in SGML files using SGML tags and attributes. For example, a user could search for all subheads that contain the word "rotor." Users will be able to output SGML ASCII files from within WorldView and will be able to see SGML pages in WYSIWYG views.

Other new features include:

▸ **Outline navigator,** which will let users click to advance through the outline elements of a document.

▸ **Dynamic recomposition,** which will let users dynamically reformat information for screen display, changing attributes such as fonts.

▸ **Intuitive search,** which will let users select a text block and say "Find more like this."

▸ **Enhanced hypertext,** which will let users create hot links from text and graphics. The current version supports hypertext links from buttons only.

▸ **Redlining,** which will let users add notes and comments.

▸ **Color,** so users can see color text and images on screen.

WorldView, which shipped in June 1992, consists of WorldView Press, a Unix product that converts documents for on-line viewing, and WorldViewer, a series of products that let Mac, Unix, DOS and Windows users view, navigate, annotate and print WorldView documents.

WorldView Press costs $10,000; WorldViewer starts at $195 per copy, with deep discounts offered for large-volume purchases.

In other news, Interleaf said the Mac version of Interleaf 5, the long-overdue upgrade to its cross-platform publishing program, will enter beta testing in June.

Interleaf Inc. is at Prospect Place, 9 Hillside Ave., Waltham, Mass. 02154. Phone (617) 290-0710; fax (617) 290-4943. □

Apple to release A/UX Version 3.0.1 next month

By Henry Norr

Cupertino, Calif. — In a slight change from previous plans, Apple will release A/UX Version 3.0.1 for general distribution next month, according to sources.

The new version will make Apple's Unix implementation compatible with the Quadra 800; the Centris 650; and Centris 610 machines upgraded to a full 68040, instead of the 68LC040 that comes standard in that model. The update will also provide a variety of bug fixes and performance improvements.

Like A/UX 3.0, Version 3.0.1 will be distributed on CD-ROM through selected dealers at a list price of $795, sources said. Upgrades will be $250.

Version 3.0.1 was developed for and began shipping this month with the Apple Workgroup Server 95. Apple said last month that Version 3.0.1 would not be marketed for other Mac models but that Version 3.0.2, incorporating the benefits of 3.0.1, would be released this quarter.

In another shift from previously discussed plans, A/UX 3.0.1 will not come with Retrospect A/UX 2.0, the new Unix version of Dantz Development Corp.'s backup program (see story, left). The Dantz software is bundled with the AWS 95, and Apple officials said last month that it would be included with Version 3.0.2.

Apple declined to comment. □

Dantz to sell Retrospect A/UX as upgrade

By Henry Norr

Berkeley, Calif. — Dantz Development Corp. this week will announce plans to market Retrospect A/UX, the Unix version of its backup software, on a stand-alone basis.

The new package, introduced last month with the Apple Workgroup Server 95, will be released to other users of Apple's Unix next month. It will require A/UX 3.0.1, which is also slated for general release early in June.

Dantz will market the Unix version as a $200 upgrade to Version 2.0 of Retrospect or its network-backup package, Retrospect Remote 2.0. Users can order the Unix upgrade by calling (800) 225-4880, Ext. 30.

Larry Zulch, Dantz president, said Dantz has not set a retail price for the Unix release because "we haven't been able to find a single A/UX customer who doesn't already have Retrospect."

Retrospect A/UX has the same look and feel as Version 2.0 for the Mac operating system, but it takes advantage of the multitasking capabilities of Unix. Dantz said the program is the only backup software that backs up the full Unix file system, including symbolic and hard links, special files and file-level privilege information, as well as all Mac files, folders, icons and privilege data.

Dantz Development Corp. is at 1400 Shattuck Ave., Berkeley, Calif. 94709. Phone (510) 849-0293; fax (510) 849-1708. □

For the record

The May 3 story on Lincoln Software Inc.'s Straight Shot listed an incorrect phone number for the company. The correct number is (617) 259-4135.

QMS offers 600 dpi at low cost

By Neil McManus

Mobile, Ala. — QMS Inc. hopes to move high-resolution output into the mainstream with a new low-cost PostScript-compatible laser printer that prints at 600 dpi.

Due this month for $1,995, the QMS 420 Print System is based on the 4-page-per-minute, 300-dpi Canon LX engine. It comes with a 20-MHz Motorola 68020 processor and 6 Mbytes of RAM, expandable to 10 Mbytes.

The printer can output at 600 dpi via QMS' proprietary Multi-Res technology, which modulates dot size to build smaller dots. It also offers a faster 300-dpi draft mode.

The QMS 420 switches automatically among the company's proprietary emulations of PostScript levels 1 and 2, HP PCL 4, and HP-GL 7475A/7550A. DEC LN03+ emulation is available for $395. The printer comes with 39 Type 1 fonts.

The printer has simultaneously active LocalTalk, serial and parallel interfaces. It comes with a 70-sheet paper cassette for letter-, legal- and A4-size paper, labels, and transparencies. A 250-sheet cassette costs $195.

In addition, QMS this month reduced the price of its 300-dpi QMS-PS 410 from $1,995 to $1,595.

QMS Inc. is at 1 Magnum Pass, P.O. Box 81250, Mobile, Ala. 36689. Phone (205) 633-4300; fax (205) 633-0013. □

Looks like Mac users just got their very own HP LaserJet.

The new generation HP LaserJet 4M printer.

At last. An HP laser printer built specifically for the Mac—the new LaserJet 4M. A laser printer with everything Mac users need. From built-in PostScript™ Level 2 software from Adobe™ to standard LocalTalk and optional EtherTalk.

True 600 dpi creates rich, full-dimensional text and graphics.

Smoother curves, no jagged edges, thanks to HP's exclusive Resolution Enhancement technology.

Microfine toner makes 600-dpi output look even sharper.

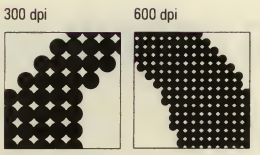
35 PostScript Type 1 typefaces for Mac and PC PostScript language users, 35 Intellifont and 10 TrueType typefaces for PC users produce a broad range of document styles.

The finest print quality in its class.
Thanks to HP's microfine toner, Resolution Enhancement technology, and advanced engine designed expressly for 600 x 600 dpi, the LaserJet 4M printer delivers the finest print quality of any 600-dpi machine available.

And with a new RISC processor and 6 MB of standard memory accelerating formatting and I/O speeds, complex PostScript and graphics files are rendered faster and more clearly than ever before.

Greater flexibility.
The HP LaserJet 4M printer also sets new standards in versatility, with a wide range of typefaces and two integrated paper trays.

As well as the options of a 500-sheet tray and power envelope feeder.



Four times the dots for better resolution.

And it's designed to be shared simultaneously by PCs and Macs. Automatic language switching between PCL 5 and PostScript, and 3 hot I/Os give mixed environments greater flexibility. Without compromise to either.

Of course, with the HP LaserJet 4M printer, you'll enjoy HP's renowned quality and reliability. All for only $2,399.* So call **1-800-LASERJET (1-800-527-3753) Ext. 7340**** for print sample† and comparison disk. Or visit your nearest authorized HP dealer.

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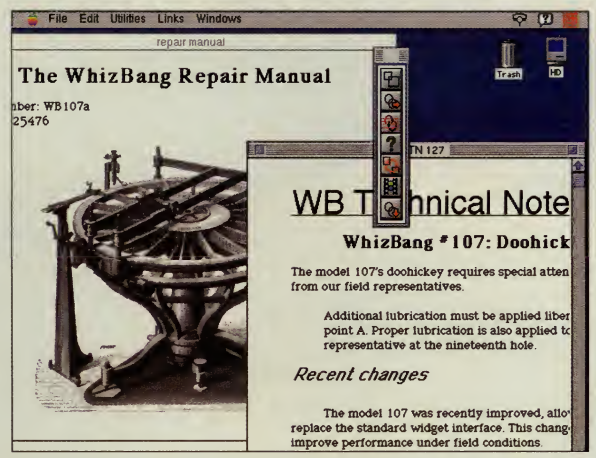
©1993 Hewlett-Packard Company PE12354 *Suggested U.S. list price. **In Canada call 1-800-387-3867, Ext. 7340. Adobe and PostScript are trademarks of Adobe Systems Incorporated which may be registered in certain jurisdictions. †To have a LaserJet 4M printer data sheet sent immediately via fax machine, call 1-800-964-1667 from your touch-tone phone.

LinksWare 3.0 gets more hooks

Hypertext builder can now call scripts



The LinksWare 3.0 hypertext system features an enhanced interface and the ability to import formatted documents.

By Raines Cohen

Monterey, Calif. — LinksWare Corp. last week enhanced its application that adds hypertext links to documents. LinksWare 3.0 speeds document import and adds new link types and AppleScript attachability.

The program, aimed at in-house CD-ROM producers, imports files such as Microsoft Word and SuperPaint documents and QuickTime movies. Users can then associate words or portions of images in the files with links to other documents.

The original files remain unchanged, and links can be modified separately from the files they act on. As a result, a company could easily offer updates of changes in links to users of a CD-ROM made with the system.

Version 3.0 adds the ability to make links to AppleScript scripts; clicking on such a link runs the associated script. The upgrade, according to the company, can also load files as much as 20 times faster than before by circumventing some features of the DataViz Inc. XTND import filters it uses to convert documents. This speed comes with a price: A document opened using the quick-load method is much larger than one imported at normal speeds.

The program can now import Microsoft Word style sheets and simple graphics embedded within word processing documents. LinksWare 3.0 incorporates a runtime module and stand-alone hypertext reader, formerly separate applications.

Upgrades are free. The program sells for $164. A Lite version, which cannot save stand-alone files or show abstracts of linked words in context, is also available for $99.

The company said an "industrial-strength" version for volume producers of CD-ROM-based documentation is slated for release this year. It will allow direct editing of the LinksWare file structure, editing of linked documents and merging of multiple link sets. The price and ship date of the new version are not set.

LinksWare Corp. is at 641 Lily St., Monterey, Calif. 93940-1631. Phone (408) 372-4155 or (800) 879-5465; fax (408) 646-9104. □

CE releases QuicKeys extension to let users key up AppleScript

By Raines Cohen

West Des Moines, Iowa — CE Software Inc. last month released an AppleScript extension for its QuicKeys macro utility.

With the extension, available free from on-line services, users can trigger AppleScript scripts from macros, and vice versa.

The combination of QuicKeys and AppleScript will let users control and exchange data with applications that don't include any scripting support.

With the extension, users can trigger scripts through QuicKeys macros when an application is launched, at a specified time or interval, with a user-configured palette or from a modal dialog.

The company said that later this year it will release a component that handles recording and converts QuicKeys sequences to text and back again. Most applications that can edit AppleScript scripts should be able to edit QuicKeys Script programs, according to CE.

Don Brown, CE vice president, said the company will also use AppleScript for rules-based message routing in a future version of its QuickMail electronic-mail program.

The AppleScript extension for QuicKeys is available directly from CE for a $15 shipping charge. It requires QuicKeys 2.1.1 or later, plus the free CEIAC background application needed for QuicKeys to support Apple events.

CE Software Inc. is at 1801 Industrial Circle, West Des Moines, Iowa 50625. Phone (515) 224-1995; fax (515) 224-4534. □

Nine to Five outputs update to HyperCard printer

Reports 2.9 expands layout, graphics tools

By Raines Cohen

Boulder, Colo. — Nine to Five Software Co. Inc. this month will upgrade its HyperCard printing and reporting tool.

Reports 2.9 adds enhanced graphics support, expanded layout features and new tools to the report-generating externals. The package includes a layout editor that lets users define mail merge letters, labels, forms, and complex row-and-column reports. The program can print on paper or to the screen.

The new version includes Search and Attributes, two stack tools previously sold separately for $89.95 each. Search provides an external sort-and-search engine to speed data look-up and retrieval. Attributes let users add interface components, including pop-up menus, calendars and dialog boxes, as well as data validation routines, to stacks.

The program's report writer component can now incorporate PICT images into reports on the fly as they are printed.

Other enhancements include variable line heights for leading control, fractional spacing support, improved scrolling-field control and the ability to save reports as stationery (template) documents.

The package also includes a set of Avery label templates and a copy of the company's new print-to-disk utility, The PaperLess Printer.

Reports 2.9 is priced at $249 ($169 through the end of May).

Users of Version 2.5 can upgrade for $45 until the end of May, or $65 thereafter. Reports 2.1 users can upgrade for $65 throughout May, and $85 afterward.

Nine to Five Software Co. Inc. is at 3360 Mitchell Lane, Suite 105, Boulder, Colo. 80301. Phone (303) 443-4104 or (800) 292-5925; fax (303) 443-4386. □

DOS, Windows to speak AppleTalk

By April Streeter

Alameda, Calif. — Farallon Computing Inc. this week will announce a developers kit to incorporate AppleTalk support into DOS and Windows applications.

Due next month, the Timbuktu AppleTalk Developer Kit is based on the AppleTalk stack Farallon licensed from Apple in December 1990. The kit will cost $5,000 for a three-user version.

It consists of DOS and Windows software modules that help developers implement many of the AppleTalk protocols necessary for building network applications, including the AppleTalk Data Stream Protocol (ADSP), the Datagram Delivery Protocol, the Zone Information Protocol and the Name Binding Protocol. ADSP is available only for Windows; the other protocols are supported for both DOS and Windows applications.

Farallon said the kit is aimed at Mac developers and in-house programmers who want to port network applications to IBM PCs or compatibles. Claris Corp. and Pacer Software Inc. are already using beta versions of the kit, according to Farallon.

Farallon will provide developers with engineering support for $8,000 per year. Developers who wish to include the stack in end-user programs will pay a royalty of between $10 and $35, depending on volume.

Farallon Computing Inc. is at 2470 Mariner Square Loop, Alameda, Calif. 94501. Phone (510) 814-5307; fax (510) 814-5020. □

Memorybank rolls back prices on storage system, tape drives

Upgraded software optimizes backups

By Kirsten L. Parkinson

Ann Arbor, Mich. — Memorybank Inc. last month dropped the prices of its Memorybank II and Memorytape storage systems by up to 20 percent.

The company also upgraded its Memorybank software, which is included with its drive systems.

Price cuts for the Memorybank II systems, which combine a 5.25-inch disk drive and either an 8mm Exabyte or digital audio tape drive, range from 7 percent to 20 percent. For example, the MB2030, with a 2-Gbyte hard drive and a DAT drive with on-board compression, now lists for $8,320, a $1,200 reduction.

Memorybank lowered the prices of its Memorytape external tape drives by up to $440. For example, the MT50, an Exabyte drive with a total capacity of 5 Gbytes, now lists for $4,320, down from $4,640.

Version 4.3 of Memorybank adds a differential backup capability, which backs up only those files that have been modified since the last complete backup of the system. This allows for faster backups and file restoration, according to the company.

Other new features in Memorybank 4.3 include 20 percent speed improvements for backup and restoration, administrator-level password protection, and a new easy-to-use main interface.

Memorybank Inc. is at 2223 Packard Road, Suite 12, Ann Arbor, Mich. 48104. Phone (313) 761-2782 or (800) 562-7593; fax (313) 761-3263. □

Version 4.3 of Memorybank includes a redesigned interface with icon buttons for easy access to the backup program's main features.

The strongest link between your Mac and Oracle Server.

Introducing 4D Oracle, the premier Macintosh-based software for connecting to Oracle Server on any of 85 different platforms.

The Future of the Connected World

Taking advantage of the Macintosh as the front-end to multiple database platforms is becoming the solution of choice for client/server environments. The Macintosh autoconfigurability and protocol stacking, when combined with the multi-tasking characteristics of 4th Dimension, allow clients to simultaneously connect to several hosts.

At ACI, we support all levels of cooperative multi-vendor computing, from terminal emulation to distributed processing. Combined with 4D, our connectivity modules address two major requirements in database development today: scalability and reduced development time.

4D Oracle Connectivity Module

4D Oracle is a set of routines that connect 4th Dimension—the best selling relational database on Macintosh—to Oracle Server running on any platform. Transparently managed by 4D, these routines access the power and functionality of both 4th Dimension and Oracle Server. To make the connection, all you need is SequelNet 1.2 or greater.

The Best for Both Worlds

4D Oracle provides features unavailable in any other Macintosh-based solution. 4D Oracle allows users to establish dynamic links between data objects in 4D—such as fields, variables, arrays—and Oracle data objects with a simple point and click. After the links have been established, users can perform any database tasks such as searches, updates, inserts, etc. Once these query definitions are built, 4D Oracle can generate code to accomplish the same tasks procedurally. To move an existing 4D application to Oracle Server, 4D Oracle provides a cloning feature to create an Oracle table that mirrors a 4D file.

The Basics—Macintosh as Emulator

The most basic service expected from a client/server architecture is the ability to query and display data residing on a host. 4D Oracle allows full customization of query dialog, extensive capabilities for data display and navigation inside the data, retrieval from several hosts simultaneously, and control over the volume of information sent to the client.

4D Oracle's graphical interface has advantages over text-based systems. But attractive screens are only a small part of this. Visualizing data graphically provides a quicker perception of its meaning.

Working Closer with the Host

The quality of interaction between 4D Oracle and Oracle Server is facilitated by the fact that 4D itself is a powerful database, able to work at the structural level with host databases. It is easy to create a 4D structure which is a twin of an Oracle database, ensuring data integrity during updates on the hosts. 4D Oracle provides two main advantages during data entry and modification which improve user productivity: built-in and easy-to-use tools for a pre-check of data accuracy during data entry, and high flexibility for data update and modification.

Macintosh Central Command

Usually, micro-computer tools are viewed from the data manipulation standpoint. With collaborative processing, 4D Oracle on the Mac now acts at the structural level to facilitate database management.

4D Oracle and other ACI connectivity products, enable the design of tools which help develop and maintain host databases. Administration, maintenance and general monitoring of systems are now the domain of the Macintosh with 4D at its core.

Developing Client Applications

4D Oracle has the same development environment found in 4th Dimension: a Procedure editor, high quality programming language, interactive debugging tools, flexible Layout editor, efficient programming add-ins, and multi-user development. A database created with 4th Dimension and 4D Oracle is easily delivered to multiple users by simply opening it with 4D Server, ACI's new client/server database for Macintosh.

Multi-user Development

By using 4D connectivity modules, Macintosh users may be connected simultaneously to 4D Server and other databases such as Oracle, Sybase, RDB, DB2 and more. And because 4D is multi-tasking, users can perform operations on data from several different sources at the same time.

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Call (408) 252 4444 ext. 246, and we'll send you a 4D Enterprise Brochure which completely describes ACI's connectivity products—4D Oracle, 4D SQL Server and 4D DAL. See how 4D Oracle and 4th Dimension link you to the data you need most.

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CLImate warms up to Mac with command-line interface

By Robert Hess

Cambridge, Mass. — Those who have tried to delete all files containing the phrase "trash" from a large folder will tell you the IBM PC and compatible-style command-line interface has its place.

Orchard Software Inc. has released its CLI for the Macintosh to answer those needs.

The $59.95 CLImate combines a proprietary syntax similar to those found in other command-line interfaces such as MS-DOS, AmigaDOS and Unix, with a BASIC language interpreter to offer considerable control over the Macintosh file system.

Users of CLImate can employ CLI features such as wild cards to operate on large numbers of files at once, as well as write batch files to automate routine tasks and repeat them any time.

The program also supports piping, a technique used in Unix to direct output from one program to another. Piping sets a variable in the second program to contain the first program's output so it can be further processed.

CLImate's BASIC interpreter is not a full implementation of the language but rather a subset optimized for file management.

The company is positioning the product as an alternative to AppleScript for both systems 6 and 7 users.

CLImate comes with several sample programs to help users learn the command language.

Orchard Software Inc. is at P.O. Box 380814, Cambridge, Mass. 02238-0814. Phone (617) 876-4608. □

If you're not using MacTools,
this is how your disk is being repaired.

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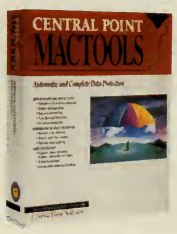

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Extreme accelerator pushes IIsi to 50 MHz

By Raines Cohen

Tukwila, Wash. — Extreme Systems last week announced a 50-MHz 68030-based accelerator for the Mac IIsi.

The Accomplice is priced at $699 and due to ship next month.

The processor direct slot card includes a pass-through slot so users can add other IIsi PDS cards, such as Ethernet interfaces and video-capture cards. Extreme said it will announce this year a video card of its own compatible with the slot.

The card comes with a built-in floating-point coprocessor. An included control panel lets users enable and disable the card's math acceleration software and the on-board 32-Kbyte direct-mapped write-through external cache.

Extreme Systems offers a 30-day money-back guarantee and a three-year limited warranty on all its products. It also sells accelerators for a number of other Mac models.

Extreme Systems is at 1050 Industry Drive, Tukwila, Wash. 98188. Phone (206) 575-2334 or (800) 995-2334; fax (206) 575-3928. □

Digital Eclipse speeds IIsi with chip change

Emeryville, Calif. — Digital Eclipse Software Inc. is offering Mac IIsi owners an upgrade to IIci capabilities.

The si/ci Upgrade, initially priced at $299, replaces the IIsi's timing circuits with ones that make it run at 25 MHz rather than the usual 20 MHz.

For owners of Apple's IIsi NuBus Adapter Card, the si/ci Upgrade also upgrades the FPU (floating-point unit) on the card to 25 MHz.

Eclipse also offers speed upgrades for several PowerBook models; it recently added a $439 25- to 33-MHz upgrade with FPU for the PowerBook 160, and a FPU add-in for $339.

All upgrades include round-trip two-day air shipping.

Digital Eclipse Software Inc. is at 5515 Doyle St., Suite 1, Emeryville, Calif. 94608. Phone (510) 547-6101 or (800) 289-3374; fax (510) 547-6104. □

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Hewlett Packard Scanjet IIc—133 line screen, factory default settings.

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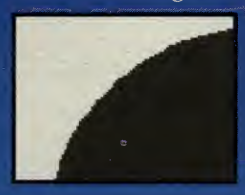
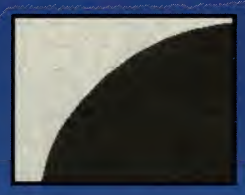


HP Scanjet IIc 800 dpi



Silverscanner II 1600 dpi

Silverscanner II—133 line screen, factory default settings.

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WE opens Human Envelopes 1.5

By Kirsten L. Parkinson

Redwood City, Calif. — Users looking for a way to create quick custom envelopes and labels might take a look at a new version of Human Envelopes, the contact database and envelope-printing utility from WE.

New features of Version 1.5 include:

- **Improved editors.** Users can now create and save custom label sizes in Human Envelopes' label editor. A user-customizable layout replaces one of the built-in Avery label templates, but a default option lets users revert to the original setup.

The envelope editor's preview now more closely approximates what the final output will look like. For example, users can preview custom envelope sizes. Built-in buttons also let users change the layout and feeding direction of envelopes.

- **Label-printing enhancements.** Users can choose to begin printing from any label on a sheet instead of automatically starting with the label in the top left-hand corner.
- **More translators.** Version 1.5 ships with XTND translators for ASCII text files and documents created with the PC-compatible versions of Microsoft Word and WordPerfect.

Other new features include expanded search capabilities and built-in keystrokes for adding entries to the database, starting a new file and printing. Human Envelopes 1.5 lists for $49.95, a $75 drop from the previous version's price tag. Upgrades are free.

WE is at 234 Marshall St., Suite 5, Redwood City, Calif. 94063. Phone (415) 368-0828 or (800) 452-2635; fax (415) 858-2598. □

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Appoint brings Gulliver to the Mac as a mouse

By Nathalie Welch

Paso Robles, Calif. — Appoint Technologies Inc. is thinking small with a new miniature mouse.

Gulliver, available now for $119, takes up 30 percent less space than a conventional mouse, Appoint said. For mobile users who want an alternative to the PowerBook's built-in trackball, the friction-operated Gulliver can be used at any angle and on any surface.

Designed so users can hold it on end by their fingertips for finer cursor control, the Apple Desktop Bus device has one large button that wraps around its rounded front to perform click, double-click and click-and-drag functions. And although Gulliver uses Apple's standard mouse control software, a second button lets users adjust cursor speed without having to access the control panel.

Appoint also announced Computer Crayon, a $49 handheld mouse shaped like a pen and geared toward the educational market. Available in primary colors, it can also be used at any angle and on almost any surface.

Much like the Gulliver, the Computer Crayon plugs into the ADB and sports a button at its tip for mouse-click functions as well as a cursor-speed control button, and it uses Apple's mouse-control software.

Appoint Technologies Inc. is at 1332 Vendels Circle, Paso Robles, Calif. 93446. Phone (805) 239-8976; fax (805) 448-1184. □

Rational's C++ Booch to be part of Bedrock

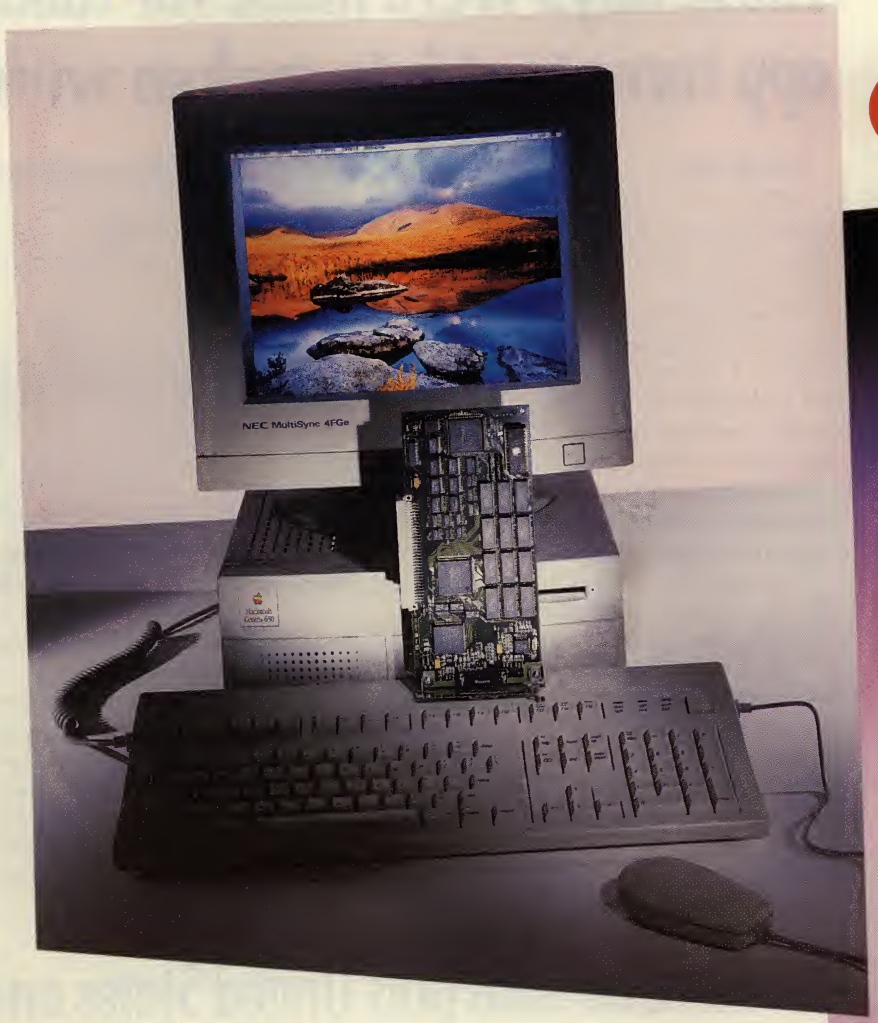
Cupertino, Calif. — Symantec Corp. and Rational last month announced they will incorporate into Bedrock, Symantec's forthcoming cross-platform development system, a collection of C++ components developed by Santa Clara, Calif.-based developer Rational.

The Booch Components is a collection of data structure classes for C++ offered for Mac, Unix and DOS development environments. A number of data structures are defined in the Booch libraries, helping developers move applications across platforms more easily.

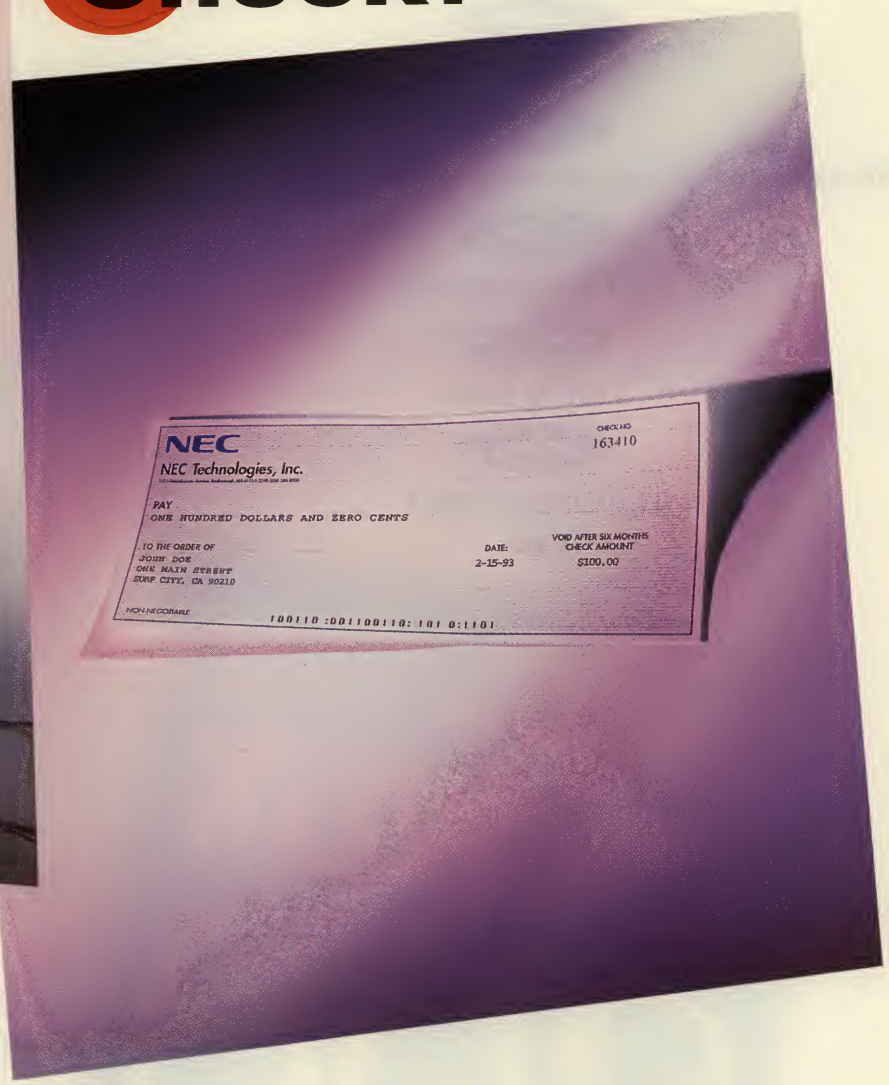
Bedrock, due by year-end, provides a set of objects that developers can use as the basic framework of an application. Symantec has promised Mac and Windows versions, with OS/2 and Unix versions expected to follow.

Symantec Corp. is at 10201 Torre Ave., Cupertino, Calif. 95014. Phone (408) 253-9600 or (800) 441-7234; fax (408) 252-4694. □

Reality.



Check.



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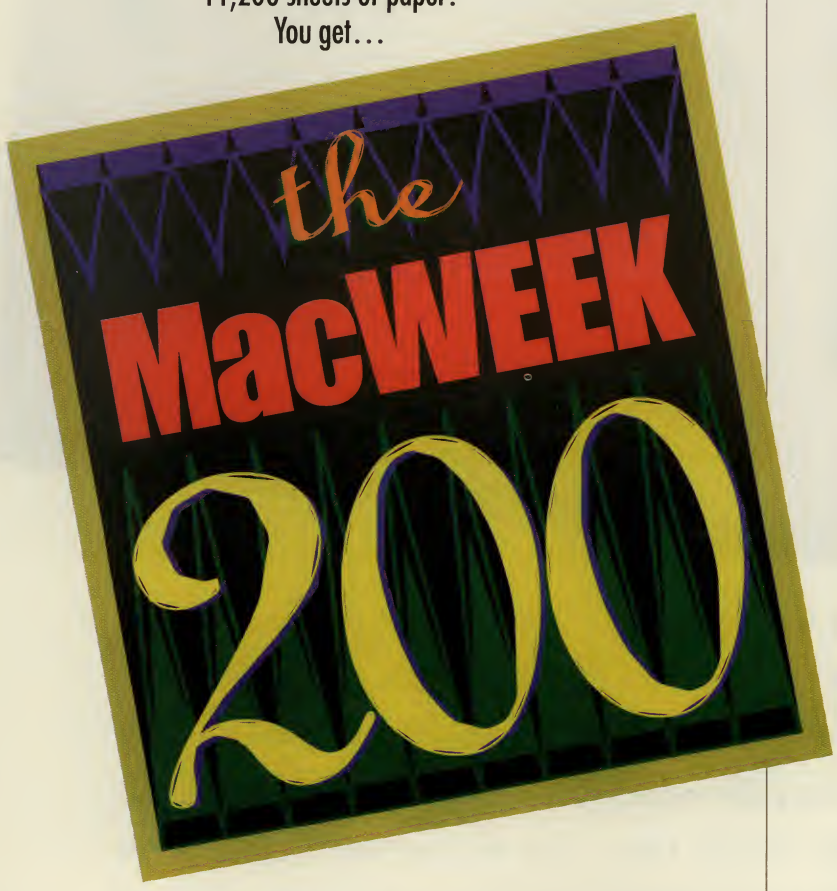
resulting in

1,400 file folders

holding

11,200 sheets of paper?
You get...



Coming in the May 24 issue of MacWEEK! The annual list of the top 200 Mac installations in the U.S. and Canada. And the top 50 educational sites. Find out what over two months of research has uncovered in this exhaustive MacWEEK survey! MacWEEK's exclusive feature takes a look at the companies - and industries - banking on Mac technology to take them into the next century.

The annual MacWEEK 200 is the most anticipated issue of the year. Don't miss this special report on the buying trends of the biggest Mac sites in North America...with an in-depth profile of the top five corporate sites and the top five educational sites.

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These keys were made for talking; app turns text into spoken words

By Ian G. Jacobs

Arvada, Colo. — Graham Software Co. last month shipped a program designed to help students and visually impaired users write and edit documents.

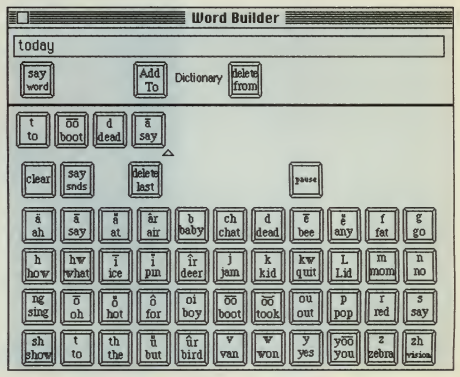
TalkingKeys Pro uses three digitized voices to speak every character or word typed into its window. A system extension included in the $35 package lets the software run in the background, speaking any text entered into other programs that are running.

A hot-key combination can activate the extension from within any application to have it pronounce any highlighted words.

The extension can also read menu items as they are selected in most, but not all applications (Microsoft Word is a noted exception).

A dictionary of pronunciations guides the program in how to speak each word. The dictionary can be edited using Word Builder, an included application that allows users to construct words phonetically. Users can teach the program how to correctly pronounce proper names, specialized jargon or regional pronunciations.

The TalkingKeys Pro application can read an entire document at one time, highlighting each word as it is spoken.



Graham Software TalkingKeys Pro includes Word Builder, which lets users construct words phonetically.

Users can associate pictures with words; the images pop up in a window whenever the program speaks the word. The package includes 25 digitized color PICT files; users can add other PICT images via the Mac Clipboard.

Graham Software Co. is at 8609 Ingalls Circle, Arvada, Colo. 80003. Phone (303) 422-0757. □

Broderbund atlas puts United States on-line

By Ian G. Jacobs

Novato, Calif. — Do you ever wonder about the average price of premium unleaded gas in Florida? The acreage of national park land in Mississippi?

Broderbund Software Inc.'s updated MacUSA atlas, which shipped last month, can tell you these and more.

The package contains data about each state, plus Puerto Rico and the District of Columbia, along with detailed maps of the states and major cities. The program includes data on political leaders, crime rates, state flags and housing costs.

The $49.95 atlas lets users create bar charts and maps comparing data from two different states or regions.

Version 2.0 includes new information culled from both the 1990 census and the 1992 elections.

The program can now play state anthems that have been enhanced with the addition of digitized instrumental sounds. Upgrades are $15.

Broderbund also offers MacGlobe, a similar program that features maps of and information on the world's countries (see MacWEEK, Oct. 19, 1992).

Broderbund Software Inc. is at 500 Redwood Blvd., P.O. Box 6121, Novato, Calif. 94948-6121. Phone (415) 382-4400; fax (415) 382-4582. □

Demco upgrades education stack for teachers

By Ian G. Jacobs

Madison, Wis. — Demco Inc. last month shipped a major upgrade to its curriculum aid for science teachers in both CD-ROM and floppy disk versions.

Science CAP (Curriculum Assistance Program) 2.0 is a HyperCard stack that includes 15 sections on science topics, such as weather and cells, designed for grades five through eight.

The new version uses QuickTime movies to illustrate some of the more challenging concepts. It adds 500 new activities, worksheets and diagrams, an improved menu system, and support for Microsoft Works and ClarisWorks.

The software lets teachers add their own sections or textural or graphic information to existing sections.

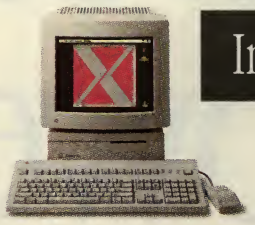
It includes activities, tests and educational games, as well as a customizable section called Classroom Management Unit that helps instructors create seating charts and instructions for substitute teachers.

Science CAP requires either Microsoft Works or ClarisWorks, MacPaint or Aldus SuperPaint, and Claris HyperCard 2.1 or HyperCard player. The disk version comes on 24 high-density floppies and takes up 25 Mbytes of hard disk space.

A single copy of Science CAP costs $699; a building license, which covers 10 copies, is $1,495; and a district license, which allows 25 copies, is $7,495. Those who purchased the disk version can choose either the ClarisWorks or Microsoft Works version; the CD-ROM includes both.

Demco Inc. is at 4810 Forest Run Road, Madison, Wis. 53704. Phone (608) 241-1201 or (800) 356-1200; fax (608) 241-1799. □

"Why's Apple talking to me about UNIX?"



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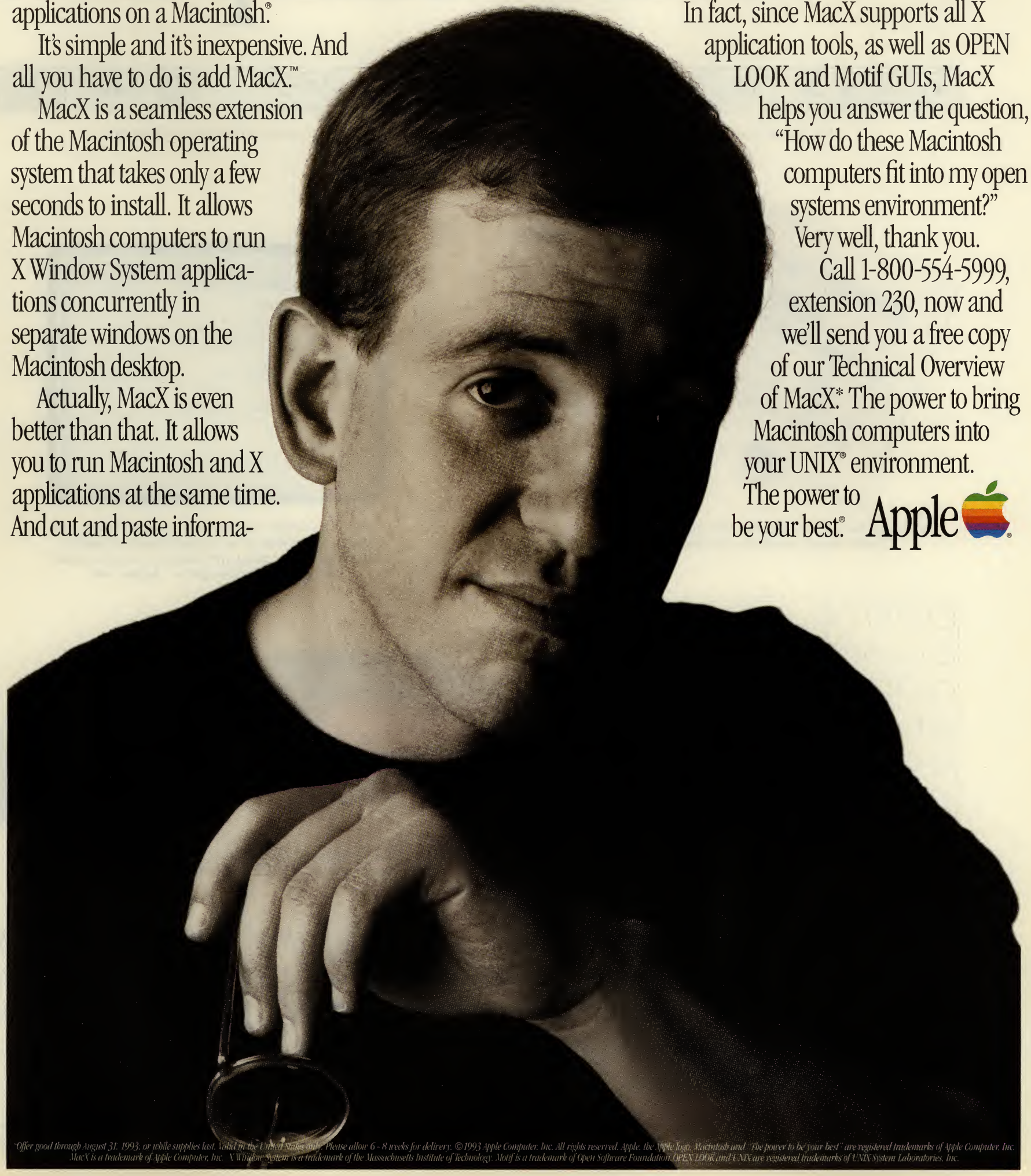

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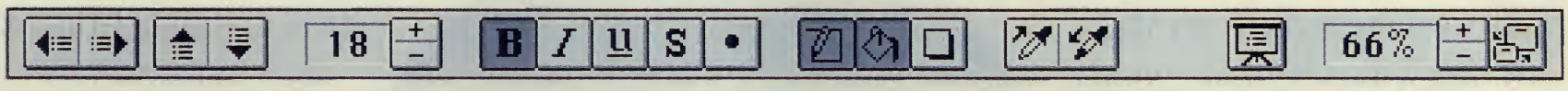
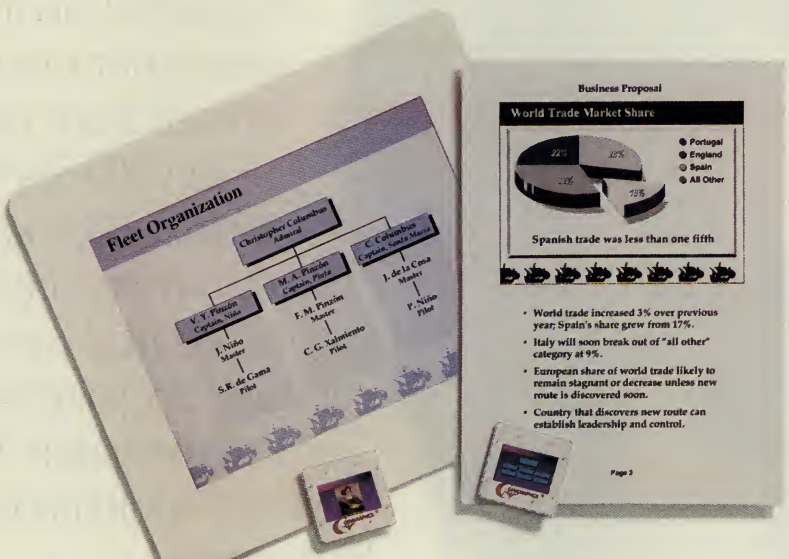
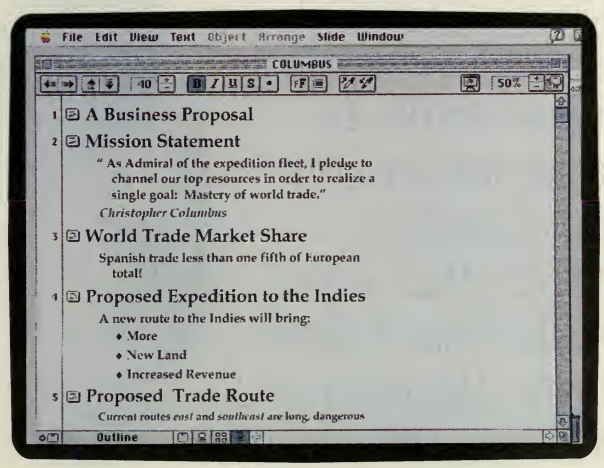
New PowerPoint 3.0. tools make power



The toolbar. A powerful way to save time. Because now the most commonly used features are just a point and a click away.



Output you have to see to believe. Creating sharp-looking overheads, 35mm slides or speaker's notes has never been easier.



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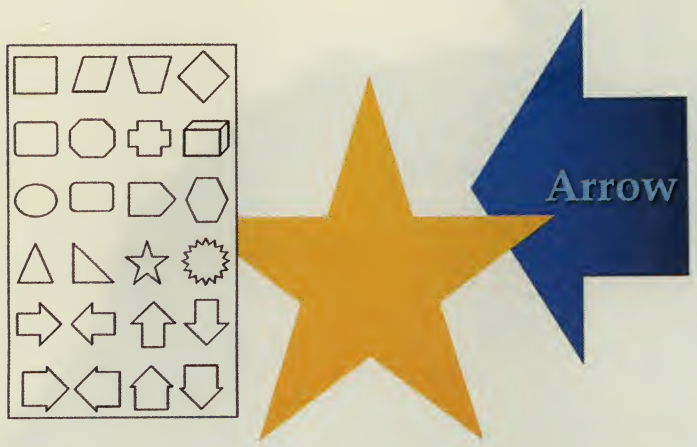

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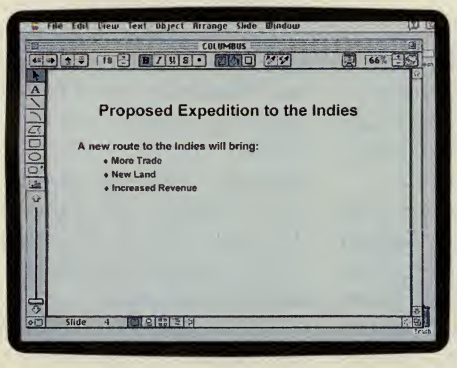

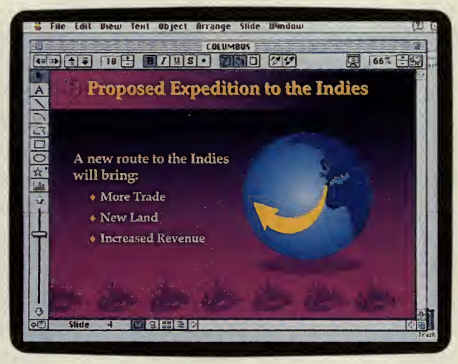

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Gateways

- Networking
- Communications

Apple to extend database access

Kit will let developers craft ODBC drivers

By April Streeter

San Francisco — Apple last week laid out plans for a series of products designed to help developers craft cross-platform applications capable of retrieving data from a variety of host-based databases.

The company announced at DB/Expo '93 here that next month it will ship a kit enabling developers to build Mac drivers and applications that are compatible with Microsoft Corp.'s Open Database Connectivity (ODBC) specification.

In addition, Apple announced a new TCP/IP-based Data Access Language (DAL) server for IBM DB2 databases and said it will add TCP/IP support to two current DAL servers.

Since last summer, Apple and Microsoft have been working to integrate DAL and ODBC, their respective technologies for accessing host data. Apple has already added ODBC support for its Data Access Manager (DAM). By the end of this year, the company said, it will release an ODBC-enabled DAL client for the Macintosh and an ODBC DAL client for Windows. A DAL client for Windows currently available from Blyth Software Inc. is not ODBC compatible.

According to Apple, Windows users with the DAL client will be able to access 17 "back-end" databases for which DAL servers are available without additional middleware to carry SQL data over the network.

Apple also pushed its forthcoming AppleScript as a way to unite Mac applications, DAL and back-end databases. For example, a user could double-click an AppleScript script to launch Claris Corp.'s FileMaker, triggering an internal script that in turn launches a DAM query document to grab data from a corporate host.

But while ODBC and DAL may share the limelight for data access, TCP/IP seems to be emerging in Apple's mind as the protocol of choice for transporting data between host databases and mixed Mac and PC LANs. The new TCP/IP-based-DAL Server for DB2 databases is due next month, and TCP/IP support will be extended to the DAL servers for AS/400 and VAX/VMS by this summer.

The DAL Server for A/UX, which currently supports TCP/IP, will also be updated to support the new Apple Workgroup Server 95.

Apple said final pricing for the ODBC developers kit, which will be part of a revised Data Access Developers Kit, has not been set. Prices for the DAL Server for MVS TCP/IP range from $35,000 to $50,000. □

Attachmate will take control of Novell 3270 emulation line

By Nathalie Welch

Bellevue, Wash. — Attachmate Corp. announced last week that it has teamed up with Novell Inc. to provide NetWare clients, including the Mac, with more feature-rich access to mainframe hosts.

Starting Sept. 1, Attachmate will take over development and support for all of Novell's 3270 emulation software, which includes NetWare 3270 LAN Workstation for Macintosh, DOS and Windows, as well as the NetWare 3270 Vector Graphics Option. Novell projected that these products would represent a $20 million revenue stream for 1993.

The products will still carry the Novell label and be offered through Novell's reseller channel. Attachmate said that IBM OS/2 and Microsoft Windows NT clients will be available within the next four months, with a Unix client planned to follow sometime after. Pricing has not yet been determined.

Novell said that the agreement with Attachmate was not exclusive and that the NetWare connections would still be available for use by other 3270 emulation vendors.

The two companies will also work together to develop a new calendar and scheduling application programming interface (API) linking Novell's NetWare Global MHS (Message Handling Service) to IBM's PROFS and OfficeVision. The new API will let developers build access to the calendar functions into their applications.

Attachmate also intends to adapt its own products to run better in the NetWare environment. To create tighter client-host integration for its Extra! terminal emulator and coaxial cards, including Extra! for Macintosh, Attachmate will develop NLMs (NetWare Loadable Modules) for Novell's NetWare for System Application Architecture Mac-to-mainframe gateway software. Novell also said it will aid Attachmate in implementing ZIP!Office, a LAN-based electronic-mail package the company released at the beginning of the year, as an NLM.

Attachmate is at 3617 131st Ave. S.E., Bellevue, Wash. 98006. Phone (206) 644-4010; fax (206) 649-6662. □

Using the design interface to create a NovaLink Professional 3.0 server also results in the automatic creation of a NovaView user interface.

NovaLink 3.0 simplifies design

By Nathalie Welch

Huntington Beach, Calif. — Designing a bulletin board system can be a click-and-drag proposition with ResNova Software Inc.'s upgraded BBS software, which also offers increased modem support and new Internet connectivity.

NovaLink Professional 3.0, shipping in base configurations of three server connections and 20 NovaTerm clients for $300, lets administrators design servers by simply dragging server components from a tool palette into a menu. Servers can still be built using the command-line server editor found in previous versions.

Servers constructed with the new server design interface generate downloadable clients called NovaView that offer users a Finder-like interface to that server. Clients still have the option of using the company's HyperCard-like NovaTerm client packages, which can be enhanced with customized graphics.

NovaLink 3.0 servers can be linked to the Internet with either of the two new ResNova packages: a $300 TCP/IP Internet Kit, which offers access only to Internet Mail and News feeds, or a $1,000 TCP/IP Professional Package, which offers full Internet functionality. Both kits require Apple's MacTCP.

NovaLink 3.0 users can now exchange mail, including file attachments, with users of CE Software Inc.'s QuickMail electronic-mail package via a new $500 QuickMail Gateway. Users can also write gateways to other E-mail packages using ResNova's NovaScript scripting language.

Upgrades to NovaLink Professional 3.0 are $95.

ResNova Software Inc. is at 5011 Argosy, Suite 13, Huntington Beach, Calif. 92649. Phone (714) 379-9000; fax (714) 379-9014. □

Net Watchman keeps eye on bigger networks

Update can handle more zones faster

By April Streeter

Walnut Creek, Calif. — The AG Group Inc. last week shipped an upgrade to its network-monitoring software, making it a more efficient watchdog for larger, multiple-zone AppleTalk networks.

Net Watchman 2.0, available for $295, scans a network's devices and services to give network managers early knowledge of potential malfunctions. According to The AG Group, Net Watchman has been fine-tuned to allow it to poll multiple AppleTalk zones faster and with diminished risk of crashing when confronted with very large networks.

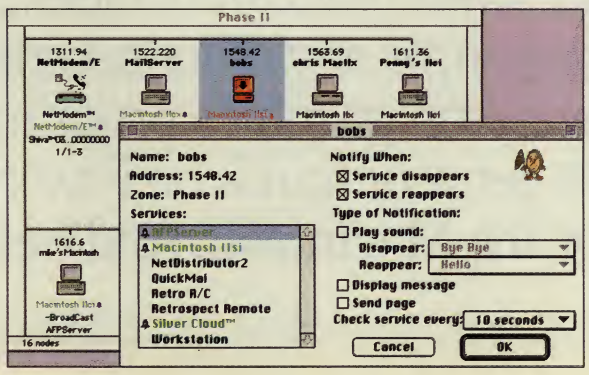
"We used to have the program on our own Macs, but the new version had improved enough in our eyes to set up a dedicated Mac that we call the 'trouble server,' " said Lou Gallo, manager of network systems at Mobil Oil Co. of Princeton, N.J. "It is hearty enough to go out and look at all our servers, which it couldn't do before."

Additional features in the upgrade include:

- **More control.** Version 2.0 allows the network manager to control initiation of scans. Previous versions automatically began scanning at start-up. A menu item lets managers cancel a scan in progress.
- **Precision polling.** Version 2.0 displays all zones in a single window and gives the number of total nodes and services in a zone. For poll lists larger than 32 Kbytes, Version 2.0 allows information to be saved in a text file.
- **More power.** The new version can monitor up to 1,000 nodes and 4,000 services, depending on how much memory is allocated to the task.

Upgrades are free.

The AG Group Inc. is at 2540 Camino Diablo, Suite 202, Walnut Creek, Calif. 94596. Phone (510) 937-7900; fax (510) 937-2479. □



Net Watchman notifies network managers of device failure. Version 2.0 lets managers more closely control when device polling will occur and when a page will be sent.

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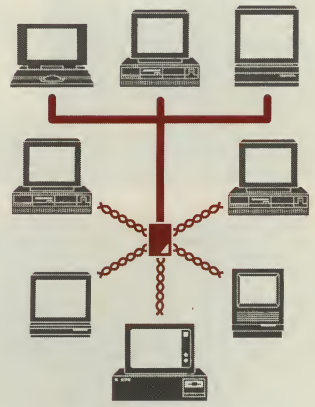

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ClearAccess to queue up Version 2

By April Streeter

San Francisco — At last week's DB/Expo '93 here, ClearAccess Corp. said it will make good on a promise to ship a new version of its database query tool this summer.

ClearAccess is a graphical query builder that uses scripts to automate database access. ClearLinks, a feature of the program, transfers captured data into applications such as Microsoft Excel.

Version 2.0, which will still sell for $460, will include a graphical report writer, a floating tool bar to contain access scripts, and a SQL database for warehousing downloaded data.

ClearAccess works with middleware such as Apple's Data Access Language and Sybase Corp.'s Open Client to let Mac users query more than 60 SQL databases, including those from Oracle Corp. and Sybase.

The company said ClearAccess 2.0, originally scheduled for a December release, was held back to allow its Windows counterpart to play catch-up. Version 2.0 features common to both will include:

- **Dashboards.** A floating tool bar can contain buttons linked to ClearAccess scripts. Buttons can be preset to run at a designated time or repeatedly.
- **ClearBase.** A SQL database for the Mac, ClearBase will let users store retrieved data on a local drive to perform subqueries without further access to the main database.
- **ClearReports.** Users will be able to summarize and chart captured data using this graphical report writer. Query results can be viewed as pie, bar or Gantt charts.

The company this summer also plans to ship ClearManager, a Windows administration program that monitors and controls database access and will support ClearAccess Mac clients.

ClearAccess 2.0 upgrade pricing has not been set. A slimmed-down version of ClearAccess with a query builder, scripting features and ClearLinks, the components the program ships with today, will be available for $340 after 2.0 ships.

ClearAccess Corp. is at 200 W. Lowe, Fairfield, Iowa 52556. Phone (515) 472-7077; fax (515) 472-7198. □

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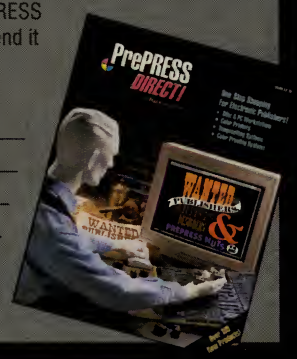

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Motorola system to link diverse communications

By Nathalie Welch

Schaumburg, Ill. — To help bridge all the incompatible messaging options coming online in the next few years, Motorola Corp. has designed technology that will let users seamlessly communicate over disparate networks.

Next month, Motorola's Paging and Wireless Data Group expects to demonstrate its new Mobile Networks Integration (MNI) technology, a system of hardware and software that will let users send information among dissimilar communications devices over different types of networks, including wireless, wired, private, public, voice and data. Something like a gateway, the system could, for example, let an Apple Newton user send a message to a pager.

MNI requires software running at each communications device as well as a switching component. Motorola will license a software tool kit and application programming interface to application developers and manufacturers of computing and communications devices. Data network carriers will have to buy a hardware switching component to make the system work. The initial switching component will run on a Tandem computer, but Motorola's network integration software can also run on other switching platforms.

First-time users will sign up over the air, receiving an identification number similar to an electronic-mail address. Personal preferences, such as the type of device the user has, desired primary carriers and call redirection, will reside in distributed databases on carrier networks. Users could also receive a consolidated bill regardless of how many service providers they use. Motorola hopes to beta test the service in the fourth quarter.

Motorola, which will develop wireless messaging products for Apple's Newton, has created an MNI developers kit for System 7, DOS and Unix. Apple declined to comment.

Motorola Inc.'s Paging and Wireless Data Group is at 1303 E. Algonquin Road, Schaumburg, Ill. 60196. Phone (708) 576-5000; fax (708) 576-1600. □

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Collage speeds clip of image editing

Specular app to offer compositing, effects

By Neil McManus

Amherst, Mass. — Specular International Ltd. is preparing a program that will let users quickly composite and manipulate high-resolution images.

Specular Collage, due to ship in July for less than $400, creates screen-resolution proxy files of high-resolution images that users can position, rotate, skew, size and manipulate. When a composition is finished, the program renders the final high-resolution file using the original images.

Collage's features include:

- **Fast compositing.** The proxy system will speed up work considerably, Specular said. Making a proxy of a 40-Mbyte image takes between 10 seconds and two minutes, depending on RAM. Proxies can be arranged and manipulated in seconds. Final rendering takes a few seconds per megabyte but varies depending on the number of effects an image employs, according to the company.
- **Layout tools.** Elements are arranged in frames that resemble those in QuarkXPress. The program offers rulers, guides and measurement boxes.
- **Masks.** The alpha channel of high-resolution images can be used as live masks in the proxies.
- **Effects and filters.** Users will be able to apply special effects such as feathering and automatic shadows. The program also offers Transfer Method controls, which resemble Adobe Photoshop's Calculation commands, and it supports third-party Photoshop filters.
- **Titles.** Collage supports Type 1 and TrueType fonts. Users will be able to add image effects to text.

Specular Collage will let users arrange elements in frames like those in QuarkXPress. It can add shadows to text and images.

Collage imports and exports both PICT and TIFF images. A Render Preview command will let users see a true-pixel rendering of a section of a layout.

With Collage, Specular joins Fractal Design Corp. and Advanced Imaging S.A. in offering faster manipulation of scanned images.

Specular International Ltd. is at 233 N. Pleasant St., P.O. Box 888, Amherst, Mass. 01004-0888. Phone (413) 549-7600; fax (413) 549-1531. □

Varityper ships fast imagesetter, readies Level 2 PixelBurst card

By Matthew Rothenberg

East Hanover, N.J. — Varityper Inc. last month expanded its Series 3000 line of output systems with a new color imagesetter that can output film twice as fast as earlier models, as well as a PostScript Level 2 accelerator based on Adobe Systems Inc.'s PixelBurst technology.

The Series 3000 line includes a variety of high-resolution output devices running on the Level 2 version of the CPSI (Configurable PostScript Software Interpreter) RIP (raster image processor) from Mountain View, Calif.-based Adobe (see MacWEEK, July 13, 1992).

New options include:

- **Model 5300H imagesetter.** The device, available now, outputs to resin-coated paper, polyester film or plate material measuring as wide as 13.3 inches at resolutions ranging from 900 by 900 dpi to 3,048 by 3,048 dpi.

The Model 5300H can generate 900-dpi images at speeds as high as 53.2 inches per minute, compared with a top speed of 26.6 inches per minute for the company's Model 5300B, Varityper said.

The imagesetter includes a SCSI interface as well as a 300-Mbyte hard disk that stores rasterized images measuring up to 12 by 18 inches at 2,400 dpi to reduce banding and speed printing of multiple copies. Users can purchase larger disks to handle bigger images, the company said.

The Model 5300H generates positive, negative, and right- or wrong-read images. It comes with a supply cassette that can hold 150 feet of paper or 100 feet of film.

A Series 3000 system with the Model 5300H costs $54,995. Owners of the Model 5300B can upgrade to the new version of the imagesetter, although Varityper said it has not yet set upgrade pricing.

Other Series 3000 packages include a $39,995 version that ships

See Varityper, Page 24

HP broadens color inkjet spectrum with RISC-based plotter, printer

By Matthew Rothenberg

Santa Clara, Calif. — Hewlett-Packard Co. last week announced domestic sales of a color plotter and released a RISC-based color inkjet printer to the European market.

- **The HP DesignJet 650C** plotter is a CMYK (cyan, magenta, yellow, black) inkjet device available in 36- and 24-inch-wide versions for $9,995 and $8,495, respectively. The DesignJet 650C outputs color images at 300 dpi and monochrome at 600 dpi. It supports plots up to 50 feet long.

The device includes a 16-MHz 80960CA RISC chip and 4 Mbytes of RAM, expandable to 20 Mbytes. It can plot a color image in 18 minutes at highest quality, three to four times faster than pen plotters, HP said. It cuts roll media automatically and stacks up to 20 plots in its output bin.

The plotter switches among HP-GL, HP-GL/2 and HP RTL languages automatically. It comes with Centronics parallel and RS-232C serial interfaces, and it supports HP's JetDirect modular input-output cards.

HP in August will ship Mac upgrade kits with Adobe PostScript Level 2 and either LocalTalk or EtherTalk for $1,375 and $1,695, respectively. The kits will include automatic scaling for large-format output and 39 Type 1 fonts.

- **The HP DeskJet 1200C/PS** printer, available in Europe for about $3,050, will ship domestically later this month for $2,399, sources said (see MacWEEK, March 29). The new printer includes Adobe PostScript Level 2 and supports resolutions up to 600 by 300 dpi.

The DeskJet 1200C/PS can output monochrome text or 24-bit-

See Inkjets, Page 24

Passport Producer 2.0 ventures into interactivity

Authoring program to add device control

By Kirsten L. Parkinson

Half Moon Bay, Calif. — Passport Designs Inc. this month will unveil Passport Producer 2.0, an upgrade that adds interactivity features to the multimedia program.

Passport Producer lets users integrate QuickTime movies, PICT images, PICS animations, text and audio into multimedia presentations.

New features of Version 2.0, due this summer, will include:

- **Interactivity.** Presentation authors will be able to insert interactive elements, allowing users to click on a button to move to another part of the presentation or loop back to an earlier segment.

Version 2.0 will ship with a library of buttons, including arrows, shapes and beveled buttons, and authors will be able to create transparent buttons from images or parts of images.

- **Path-based animations.** Built-in path tools will let users animate objects, including text, PICT images and QuickTime movies. The program will have eight default paths for animations, such as moving from the top to the bottom of the screen, as well as a custom path option.
- **Device control.** Producer 2.0 will support external devices such as VISCA (Video System Control Architecture)-compatible devices and Pioneer laser disc machines. This will allow authors to incorporate material from other sources into their presentations, Passport said.
- **Icons.** Users will be able to click on new icons to create elements such as markers and buttons and to crop and stretch cues.

Other new features will include automatic anti-aliasing of text and the capability to add outlines and drop shadows to objects.

Producer 2.0 will be $495, the same as the original version; with Passport's announcement of Version 2.0 on May 24, the price of Version 1.0 will drop to $149. Upgrades will be free.

Passport Designs Inc. is at 100 Stone Pine Road, Half Moon Bay, Calif. 94019. Phone (415) 726-0280; fax (415) 726-2254. □

Passport Producer 2.0, shown here in an alpha version, will include icons for quick access to frequently used features, such as markers, buttons and cue-editing options.

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After Effects picks up speed, controls

Version 1.1 lets users view alpha channel

By Neil McManus

Providence, R.I. — The Company of Science & Art this week will ship an upgrade to CoSA After Effects that adds controls for special effects and achieves faster rendering speeds.

Like the original version of the software, After Effects 1.1 is a $1,295 package that offers QuickTime movie makers high-end features such as time-based filters, unlimited compositing and field rendering for video-out.

Version 1.1 lets users view the alpha channel of a composition with a mouse click or key command. Effect parameters, such as the radius of a sphere or the position of type, can now be adjusted numerically.

Performance improvements include faster composite rendering in high-quality mode and interruptible redraw while manipulating layers.

CoSA After Effects 1.1 lets users adjust effect parameters numerically. The project window can list objects by type as well as alphabetically.

In a nod to keyboard-happy video editors, CoSA has outfitted After Effects 1.1 with key commands for functions such as selecting all objects, zooming in and out, and setting time markers.

The program's project window now lets users view objects by type as well as alphabetically.

Upgrades are free to registered users.

The Company of Science & Art is at 14 Imperial Place, Suite 203, Providence, R.I. 02903. Phone (401) 831-2672; fax (401) 831-2675. □

ColorAge lines up RIP software for networks, calibration, copiers

By Carolyn Said

Billerica, Mass. — ColorAge Inc. this month announced an upgrade to its ColorQ System; a technology for outputting accurate spot colors; and a new version of Freedom of Press, the company's software PostScript interpreter.

▸ **ColorQ System 2.0.** ColorQ turns Canon CLC 300/350 or 500/550 and Kodak ColorEdge 1550/1550+ color copiers into PostScript-compatible, continuous-tone-color network printers. Version 2.0, due this month starting at $29,995, adds support for native print services on Novell networks; it continues to offer Chooser-level support for AppleTalk networks.

ColorQ 2.0 also offers TIFFoto, a feature that lets users output continuous-tone-color TIFF images at high speed without having to import them into a page-layout document as Encapsulated PostScript graphics. CAI said this feature will be particularly useful for professional photo labs that need to print a large volume of Photo CD and other photographic images.

▸ **SpotMatch.** CAI also announced SpotMatch, new calibration technology the company said will let nonexpert users adjust CLC copiers to match specific spot colors from the Pantone Matching System. According to the company, SpotMatch calibration will not affect the calibration of scanned images even if they are on the same page. CAI said a future version of the ColorQ System will incorporate SpotMatch, but the company did not announce pricing and availability.

▸ **Freedom of Press Classic.** CAI said the new version of its software PostScript interpreter will replace the $149 Light and $495 Standard versions. Freedom of Press Classic, due this month for $149, comes with 35 fonts (up from 17 in the Light version) and adds support for new printers such as Hewlett-Packard Co.'s HP LaserJet 4ML. Upgrades are $45.

ColorAge Inc. is at 900 Technology Park Drive, Billerica, Mass. 01821. Phone (508) 667-8585; fax (508) 667-8821. □

Dynaware strikes up medley of MIDI programs

New apps edit, play MIDI from Mac

By Kirsten L. Parkinson

Foster City, Calif. — Dynaware USA Inc. has arranged three new software solutions to help Mac musicians orchestrate their MIDI documents.

▸ **GS Controller,** available now, is a $68 software interface that lets users edit and store MIDI (Musical Instrument Digital Interface) files created with keyboards and GS sound modules from Roland Corp. US of Los Angeles.

With the built-in tone editor, users can edit musical attributes such as ADSR (attack, decay, sustain and release) envelope settings, pitch and reverb and save the edited file in Standard MIDI format. A bulk dump-and-receive feature lets users save the current settings as a file that can be reapplied to other MIDI files.

▸ **Super MIDI Player,** available now for $88, allows users to play back MIDI files via a standard tape-recorder interface. Users can create a playback list of up to 100 MIDI files. The software automatically finds and plays back the files when the list is loaded.

The Super MIDI Player incorporates all of the tone-editing and librarian features of the GS Controller.

▸ **Ballade 1.1,** due later this month, adds support for Roland's $399 SC-7 sound module (see MacWEEK, Nov. 16, 1992) and Yamaha Corp. of America's Tone Generator (see MacWEEK, May 3). The upgrade also features a faster mixing interface, the company said.

Ballade is a 16-track sequencing and scoring program that lets users create, edit, mix and print MIDI files. It includes a virtual keyboard for inputting notes from the desktop.

Version 1.1 lists for $99.95, down from $195 for the previous version. Upgrades are free.

Dynaware USA Inc. is at 950 Tower Lane, Suite 1150, Foster City, Calif. 94404. Phone (415) 349-5700 or (800) 445-3962; fax (415) 349-5879. □

The mixing window in Ballade 1.1 has been redesigned, speeding the program's 16-track MIDI mixing features. The program now retails for $99.95.

Inkjets

From Page 22

color graphics to letter-, legal- and A4-size plain or coated paper as well as transparencies. It includes three print modes at speeds ranging from 4 to 7 pages per minute for black-and-white text and from 1 to 3 minutes per page for color images.

The DeskJet 1200C/PS switches automatically among Level 2, color PCL 5 and HP-GL/2 and includes a font-card slot. It ships with 35 Type 1 and 10 TrueType fonts, and it includes Adobe Type Manager.

The printer ships with LocalTalk and Centronics parallel interfaces as well as an MIO slot for HP's JetDirect interface cards.

The device includes an 11-MHz Intel i80960SA RISC chip and 4 Mbytes of RAM, which can be expanded to 20 Mbytes. It comes with a 180-sheet input tray, a manual feed and a 100-sheet output tray.

The printer is also available as the DeskJet 1200C, a PCL 5-only configuration that includes 2 Mbytes of RAM. Sources said the DeskJet 1200C, which costs about $2,180 in Europe, will be $1,699 when it ships here later this month.

HP last week also announced it has trimmed the price of its DeskWriter monochrome inkjet printer to $399, an $80 reduction. This price cut is the second in two months for the printer; HP in March reduced the cost of the DeskWriter by about 20 percent, to $479 (see MacWEEK, March 15).

In addition, HP introduced new drivers that provide the company's DeskWriter C and DeskWriter 550C color inkjets with support for Apple's ColorSync software and add seven new Type 1 font families to the printers. Users can call (303) 353-7650 to order the new drivers.

Hewlett-Packard Co. Direct Marketing Organization is at P.O. Box 58059, MS511L-SJ, Santa Clara, Calif. 95051. Phone (800) 851-1170; fax (800) 333-1917. □

Varityper

From Page 22

with the Model 5300B imagesetter and a $54,995 version that comes with the SmartJet 4012, a continuous-tone CMYK (cyan, magenta, yellow, black) inkjet printer manufactured by Scitex America Corp. of Bedford, Mass. Varityper offers a variety of packages and upgrades that include more than one Series 3000 output device.

In addition to the software RIP, the Series 3000 devices ship with 35 Type 1 fonts; Adobe Type Manager; and Escor, proprietary screening software designed to eliminate moiré patterns and improve spot geometry. Varityper recommends a Mac IIfx or 68040-based model equipped with System 7, at least 16 Mbytes of RAM, an internal hard drive and a floating-point coprocessor.

▸ **PixelBurst accelerator.** Varityper said that by July it will release a $9,995 option that will outfit its Series 3000 systems with PixelBurst, an application-specific integrated circuit (ASIC) from Adobe (see MacWEEK, Oct. 5, 1992).

According to Varityper, the PixelBurst ASIC, which ships on a NuBus card manufactured by RasterOps Corp. of Santa Clara, Calif., speeds rasterization of halftones on Series 3000 devices by up to 10 times.

Varityper Inc., a subsidiary of Tegra Inc., is at 11 Mount Pleasant Ave., East Hanover, N.J. 07936. Phone (201) 887-8000 or (800) 631-8134; fax (201) 887-0731. □

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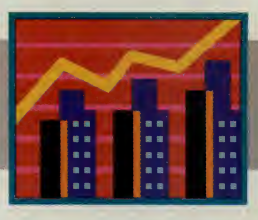

Microsoft co-founder to buy AOL?

Buyout could put AppleLink in doubt

By Jon Swartz

Vienna, Va. — Paul Allen, a co-founder of Microsoft Corp. and president of Asymetrix Corp., said last week he is seriously considering a bid to acquire America Online Inc.

Allen, who holds a 24.9 percent stake in the company, disclosed his intentions in a filing with the Securities and Exchange Commission. He said he may seek representation on AOL's board of directors and may acquire additional shares of the company.

Industry analysts said the prospect of Allen, a director at Microsoft, owning AOL could seriously impede Apple's developing relationship with America Online.

Allen's initiative comes just several months after Apple signed a technology-licensing agreement giving it access to AOL's communications software. Apple will fold the technologies into future versions of AppleLink and other on-line services that Apple will manage and market. Apple also has the option to acquire 500,000 shares of America Online at $25 each (see MacWEEK, Dec. 14, 1992).

"I'm sure Apple would be concerned about making a strategic commitment to a company that is owned by the co-founder of a major rival like Microsoft," said Michael Murphy, editor of the California Technology Stock Letter in Half Moon Bay, Calif. "Allen realizes the future of computers is in connecting them through on-line services. It's no surprise Apple reached the same conclusion."

Allen said AOL's board so far has denied his request to give him a copy of the company's shareholder-rights plan, which is designed to make a potential takeover costly. He said the anti-takeover defense had caused him to reconsider his current position as a passive investor.

Allen said that if his current effort fails, he might continue as a passive investor or consider selling his shares.

Allen was traveling last week and could not be reached for comment.

Peter Friedman, director of Apple On-line Services, would offer only that Apple "maintains a strong relationship" with AOL. He declined to comment directly on Allen's proposed bid.

AOL officials declined to comment.

News of a potential takeover sent America Online's stock up $4.25 per share to $30.50 in over-the-counter trading last week.

In a related announcement, AOL said it will sharply reduce prices for some of its on-line services to boost market share. □

America Online

- Founded: 1985
- CEO: Stephen M. Case
- Headquarters: Vienna, Va.
- Technology: On-line consumer services
- Employees: 210
- 1992 revenues: $26.6 million

Symantec is getting into the Act! with takeover of Contact Software

$41 million lands Texas developer

By Lisa Picarille

Cupertino, Calif. — Symantec Corp. last week acquired Contact Software International, developer of the Act! contact-management series, in a deal worth about $41 million.

Contact, a private company with $15.1 million in fiscal 1992 revenues, is Symantec's 13th acquisition in nine years.

Under terms of the deal, Patrick Sullivan, Contact Software president and CEO, becomes vice president and general manager of Symantec's newly formed contact-management group. Sullivan reports to Gene Wang, Symantec's vice president of productivity applications, project management and tools.

Both Contact Software's Carrollton, Texas, headquarters, and its Foster City, Calif.-based development operations will be relocated to Symantec's headquarters here.

Symantec officials declined to comment on how many of Contact's 100 employees would be laid off because of the merger.

Contact Software's Act! program combines a contact database, calendaring and scheduling features, and a built-in word processor. Act! is available for Mac, DOS, Windows and Hewlett-Packard Co.'s HP 95LX palmtop computer.

With the acquisition, Symantec hopes to duplicate its wildly successful 1990 acquisition of Peter Norton Computing Inc. of Santa Monica, Calif.

"I think we have identified the next Norton group for us," Wang said. In addition, Symantec's enviable position in the channel and its marketing muscle is expected to boost Act! sales, according to Mike Muhney, Contact Software's vice president of marketing, who will join Symantec as vice president of the contact-management group.

Muhney said he expects revenues for Act! for Macintosh, which shipped last fall, to account for a third of Act! revenues in the near future. □

Apple challenges its own mythology

In an effort to get its employees to rethink comfortable assumptions, Apple recently distributed a report designed to challenge what it called "myths" about the computer-using public. Among them:

- The Macintosh is very easy to use.
- People who use DOS/Windows are a frustrated bunch.
- The Macintosh advantage can target a particular customer.
- People like anything that is new and different.
- Everyone knows Apple is a company and the Macintosh is a product.

Source: Apple internal marketing.

CE Software, under new CEO, trims its staff and advertising

By Nathalie Welch

West Des Moines, Iowa — A three-month delay in the shipment of its flagship product, QuickMail 2.6, has forced CE Software Inc. to make cutbacks.

The company, based here, said it has laid off eight employees, or 7 percent of its 105-person staff, and scaled back on advertising.

"Our business is not contracting. We have restructured," said Ford Goodman, who was promoted last month from CE Software executive vice president to president and CEO. "We had hired and built our infrastructure based on us getting QuickMail 2.6 out a lot earlier than we did."

Goodman said CE Software expected $3 million in sales for its second quarter ended March 31 and spent accordingly on operations. But when the company announced QuickMail 2.6 would ship in late March instead of December, he said, users held off from purchasing the electronic-mail package until the latest version hit dealers' shelves. "That definitely hurt sales," he said.

CE Software's second-quarter results, to be released next week, will show a slight drop in sales, according to Goodman.

Last week's layoffs came out of product teams and technical services, Goodman said. He added, however, that CE Software is still looking to hire several senior-level managers.

The company is reducing spending on print ads and increasing direct mailings and on-site calls. "We want to devote more of our efforts to guerrilla marketing," said Goodman, who replaced Richard Skeie as head of CE Software Inc. Skeie remains president and chairman of CE's parent company CE Software Holdings Inc. □

StockWatch

	05.05.93 CLOSE	WEEKLY % CHANGE
Apple	54.50	6.08
SOFTWARE DEVELOPERS		
Adobe	61.00	10.91
Aldus	15.25	3.39
Caere	9.50	26.67
CE Software	3.25	0.00
Microsoft	89.25	3.78
Novell	30.75	2.07
Symantec	15.63	23.76
PERIPHERALS VENDORS		
CMS	2.38	0.00
HP	76.25	4.45
Mass Micro	0.38	-14.38
QMS	15.38	1.65
Radius	3.88	-4.63
RasterOps	7.00	1.82
Sigma	5.25	-2.33
SuperMac	18.25	10.61
STORAGE		
Conner	12.75	-0.97
Maxtor	6.75	1.89
Quantum	14.50	6.42
Seagate	16.13	3.20
SyQuest	13.00	14.29
INDUSTRY INDICATORS		
DEC	46.75	6.86
IBM	49.25	-1.50
Motorola	77.38	10.34
Sun	27.13	4.83
Dow Jones	3449.10	1.04

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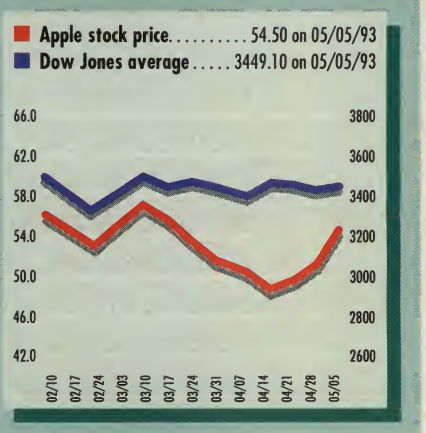

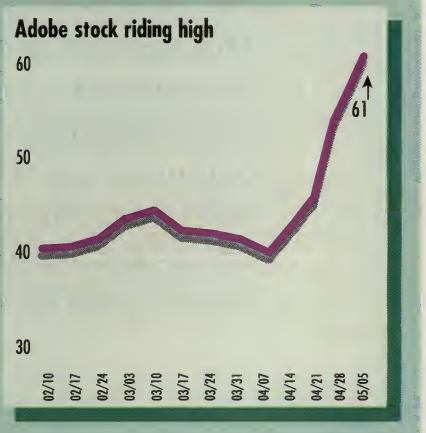

Adobe Systems Inc.'s stock continued a four-month ascent last week, rising 11 percent to $61 per share. The Mountain View, Calif.-based software developer's stock has jumped 70 percent since January.

Industry observers attributed the sharp increase to two factors: continuing strong PostScript sales and the anticipated release of Acrobat, which promises to let users of Macs, DOS and Windows exchange documents.

In a new, independent lab test, the 24-bit color graphics card most people think of as fastest, wasn't.

If This Independent Test Doesn't Astonish You, The Cost Difference Should Leave You Thunderstruck.

Ingram Laboratories ran a Hydra QuickDraw™ performance test and found Radius' PrecisionColor 24X™ was 19% faster overall than the Thunder/24™.

That's surprising, especially since the makers of Thunder/24 want you to pay $1,250 more for their card.

PrecisionColor 24X isn't just faster and less expensive. It's also available in 7" and 9" versions. So it will fit in all of Apple's newly-announced systems, as well as current models.

No wonder MacUser rated PrecisionColor 24X "Best Price/Performance." And both MacWorld and Byte named it their "Readers' Choice."

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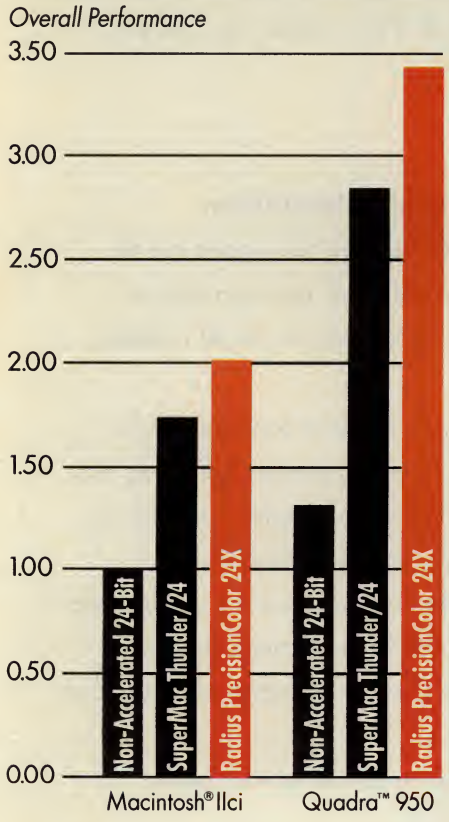

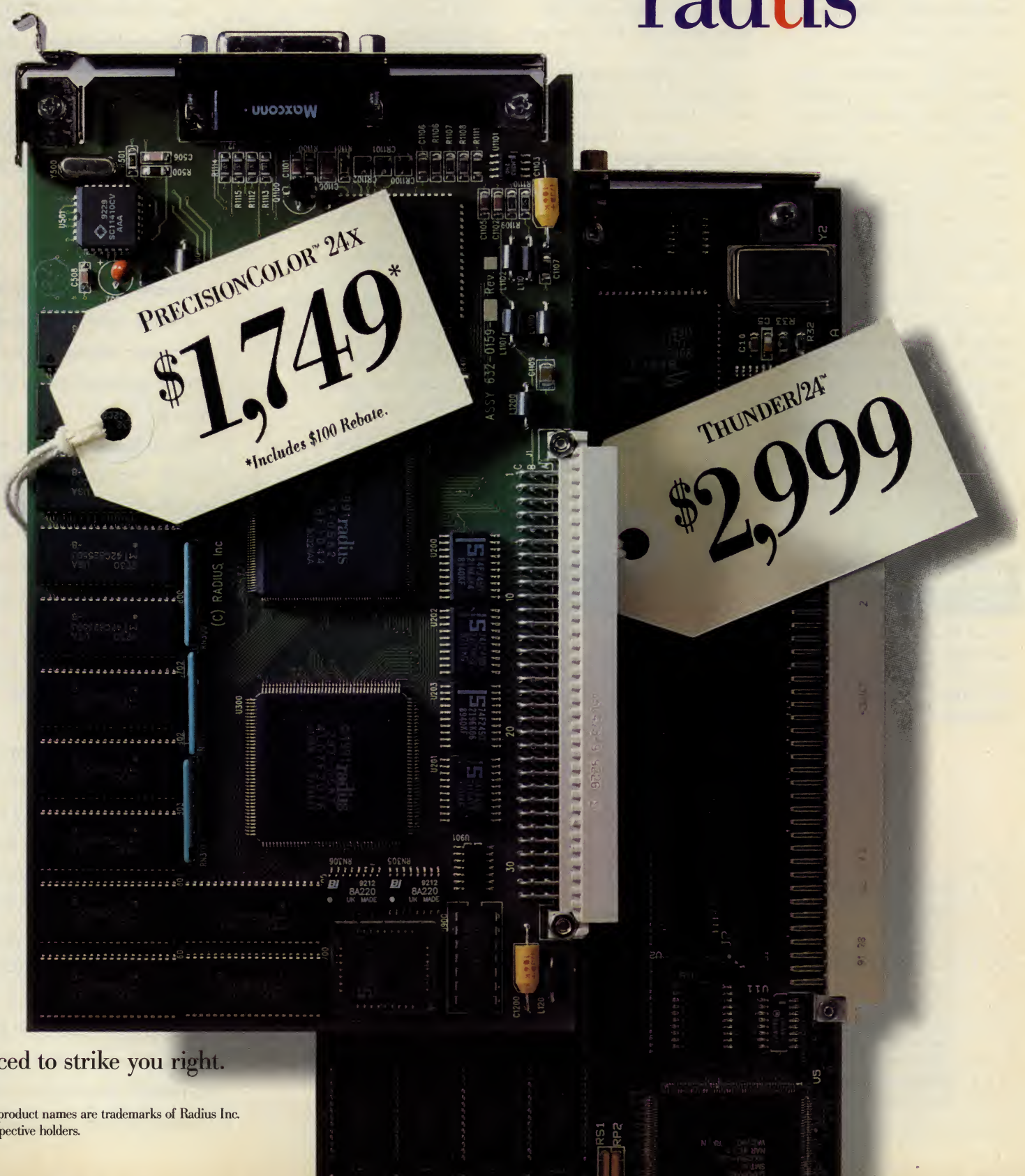

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Dealer's Corner by Scott Harris

PB Duo sales are anything but dynamic

Editor's Note: Scott Harris' observations on reseller issues and the larger Mac scene will appear in this space monthly.

Recent reports indicate that the PowerBook Duos are not meeting Apple's sales expectations. I can't say I'm surprised. The Duo system has suffered from basic marketing problems from the start.

- When the Duos first shipped, docks were difficult to find and modems were not available at all. By the time these critical add-ons reached resellers, initial user interest had died down.
- To sell the Duo system, dealers need to put units on display so customers can appreciate the technology's unique advantages. But the Duo and its accessories carry low profit margins for the reseller, and that has not enticed many dealers to set aside systems and dedicate floor space for demo purposes when more profitable equipment could be shown instead.
- It's a difficult concept to explain and sell. When someone unfamiliar with the Duos comes in and asks about a portable Mac, salespeople will probably be less inclined to spend their time explaining the Duo concept when it's easier and faster to sell an all-in-one PowerBook.

Selling the Duo also means explaining each of its options, such as adapters and docks. But when the items aren't simple to explain and the potential commissions are small, salespeople are often reluctant to spend the time.

- Duos are expensive, even after last month's price cuts. At $1,839 a Duo 210 4/80, for example, is about the same price as a PowerBook 145.

But the 145 already has a floppy drive and a standard set of ports — features that cost Duo buyers hundreds of extra dollars. And buying a Duo Dock, keyboard and monitor for desktop adds well more than $1,000 to the total cost of their system.

At those prices, customers could almost buy a PowerBook 145 and an LC III instead of Duo setup.

- The Express Modem has deterred some potential Duo buyers. Many users have had good luck with it, once Apple fixed a few initial software glitches, but other users continue to report sporadic problems. And many hesitate to commit to a technology when no third-party options are available.
- The lack of a SCSI port is also a hindrance. If you need to travel with a SCSI device to take advantage of its ability to quickly share data with other Macs via the SCSI port or you want to connect to another SCSI device at one of your destinations, you have to buy a rather expensive and clumsy-to-transport MiniDock. If a SCSI port can't be built in, Apple should at least offer one in a small, cheap adapter. (At least the floppy adapter is relatively inexpensive.)

Apple should not see a shortfall in sales as necessarily indicative of a flaw in the product or the concept. The Duo is intriguing, versatile and potentially one of the most useful implementations of today's notebook technology.

Sure, it could be fine-tuned. For example, it might be nice to see a Duo Dock with a lid that could be removed so the Duo's own screen could be used. This would help people buy into the concept with less initial outlay.

Or Apple could add a plug-in module that would give the Dock some intelligence even when the Duo is removed, so a Duo user might remotely dial into his dock to access attached storage devices. Such a module might also give the unit some limited stand-alone capability for another user.

Most of all, Apple needs to work on Duo marketing. In part, that means improving product, pricing and presentation. It also means getting the company's dealers behind the system, which in turn means Apple has to get behind its dealers. □

Scott Harris specializes in sales, support and training at The Computer Edge, a computer specialty store in Mount Kisco, N.Y.

MacWEEK index
APRIL TOP SELLERS

The top 10 products by dollar volume and category at ComputerWare, a chain of Mac-only resellers in California. The list does not include Apple-label products:

MAR.	APR.	General applications
1	1	Microsoft Office 3.0
5	2	QuarkXPress 3.1
2	3	Microsoft Word 5.1
4	4	Claris FileMaker Pro 2.0
6	5	ClarisWorks
3	6	Microsoft Excel 4.0
*	7	Abacus StatView 4.0
7	8	Aldus PageMaker 4.2
*	9	ACI US 4th Dimension
*	10	Aldus Persuasion 2.12

MAR.	APR.	Graphics and multimedia
1	1	Global Village PowerPort/Gold 14000
3	2	Global Village TelePort/Gold 14000
4	3	Global Village PowerPort/Silver 9600
*	4	Forallon Timbuktu 4.0
*	5	Asanté MacCon+IIET64 Ethernet cord
*	6	Asanté MacCon+LCIII Ethernet card
2	7	Supra FaxModem V.32 MacPac
6	8	Asanté MacCon+IIE64 Ethernet card
*	9	Synergy VersaTerm-PRO 3.6
*	10	Global Village TelePort/Silver 9600

MAR.	APR.	Hardware
1	1	Hewlett-Packard LoserJet 4M printer
2	2	Hewlett-Packard DeskWriter printer w/AppleTolk
*	3	RasterOps Mono/Grey 21-inch monitor
8	4	Hewlett-Packard DeskWriter 550C printer
6	5	PLI Infinity 88-Mbyte removable drive
5	6	Radius Two-Page Display 19-inch monitor
*	7	SuperMac DigitalFilm
*	8	Radius Two-Page Display 21-inch monitor
*	9	Radius PrecisionColor 20SL monitor
*	10	Hewlett-Packard ScanJet IIc

MAR.	APR.	Graphics and multimedia
1	1	Adobe Photoshop 2.5
2	2	Adobe Illustrator 3.2.3
3	3	Fractal Design Painter 2.0
4	4	Adobe Dimensions
6	5	Claris MacDraw Pro 1.5
*	6	Gryphon Morph 1.1
*	7	Aldus FreeHand 3.11
10	8	Adobe SuperATM
7	9	Deneba Canvas 3.0
*	10	HSC Kai's Power Tools

MAR.	APR.	Utilities
3	1	Symantec AntiVirus for Mac 3.5
1	2	Symantec Norton Utilities for Mac 2.0
10	3	Berkeley Systems After Dork/M.A.D. bundle
2	4	CE Software QuicKeys 2.1.3
4	5	Now Utilities 4.0
*	6	Symantec Norton Essentials for PowerBook
*	7	Aladdin StuffIt Deluxe 3.0
8	8	Berkeley Systems After Dark 2.0
5	9	Fifth Generation DiskLock 2.1
6	10	Fifth Generation Suitcase 2.1

**Didn't make top 10 last month.*

Business BRIEFS

Apple ready to add three more mass merchants

Cupertino, Calif. — Wal-Mart Stores Inc., The Good Guys Inc. and The Wiz are slated to add their mass-merchant muscle to Apple's ongoing campaign to put Performas in the hands of consumers.

The three chains — which total about 1,000 stores nationwide — are next in line to sign distribution agreements with Apple to carry Performas. The distribution deals could go into effect as early as this summer, according to sources briefed on Apple's plan.

The addition of Wal-Mart, based in Bentonville, Ark.; The Good Guys, based in Brisbane, Calif.; and The Wiz, based in New York, will increase the number of consumer outlets carrying Performas to 2,300.

Performas are currently sold through nine mass-merchant outlets, including Sears, Roebuck & Co., Circuit City Stores Inc. and Silo Inc.

Apple declined to comment.

Creative Technology acquires ShareVision

Milpitas, Calif. — Creative Technology Ltd. jumped into the Mac videoconferencing picture last week, signing a letter of intent to purchase ShareVision Technology Inc. for $11 million in cash.

ShareVision, a private company based in San Jose, Calif., recently introduced a videoconferencing product that allows Mac users to communicate using video, voice, graphics and data anywhere in the world over a single, standard telephone line.

Creative Technology develops and markets a line of sound and video multimedia products for IBM PCs and compatibles. In a statement, CEO W.H. Sim said Creative intends to eventually port ShareVision's technology to PCs.

The acquisition is expected to be completed next month.

Energy Star program aims to shine brightly

Washington — President Clinton has signed an executive order requiring federal agencies to buy personal computers and printers that meet the new Energy Star standard for power consumption. The order will go into effect in six months.

Energy Star, sponsored by the U.S. Environmental Protection Agency, has garnered support from Apple, Hewlett-Packard Co. and others. The Color Classic is Apple's only CPU that now meets Energy Star standards.

Government researchers estimate that the 35 million personal computers in the United States last year accounted for 5 percent of the nation's electricity use, or enough to power New Hampshire, Vermont and Maine for a year.

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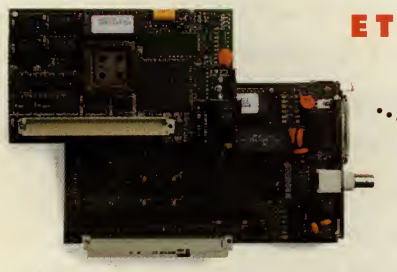

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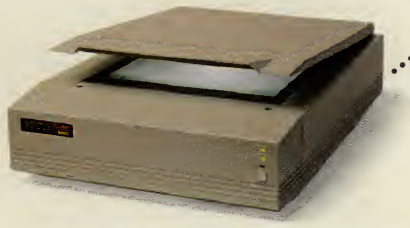

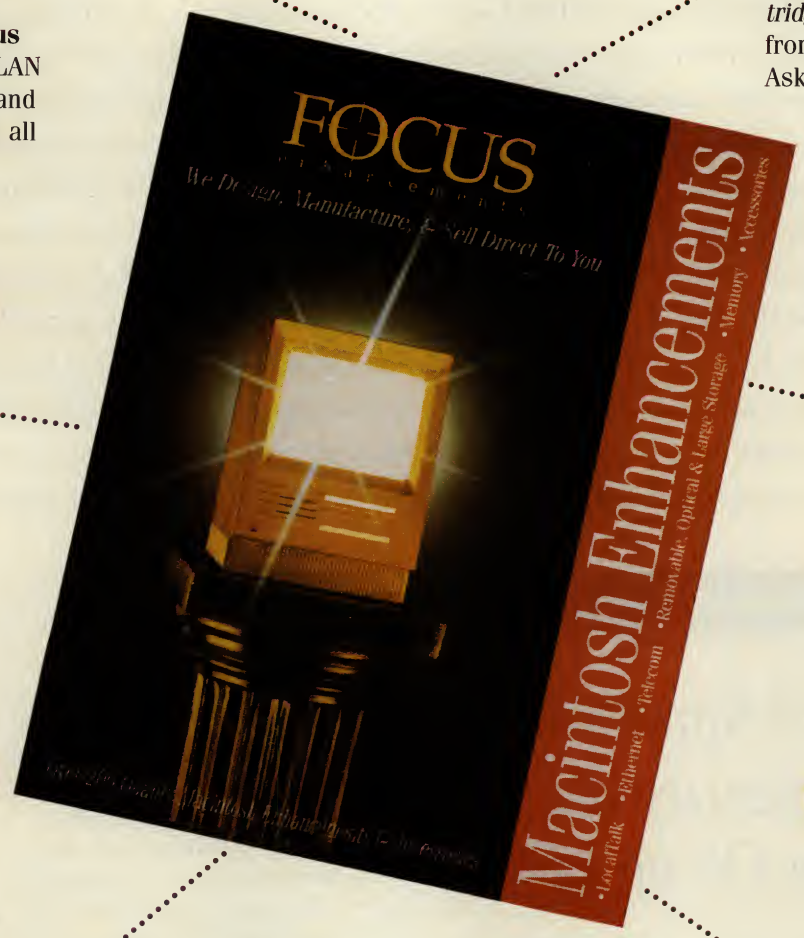

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BPA

EDITORIAL

Macs get second-class status on LANs

In this week's Reviews section MacWEEK presents the most exhaustive testing ever attempted of Macintosh clients on industry-standard network operating systems. The results give us pause.

When it comes to administration of Mac clients, Banyan Systems Inc.'s excellent StreetTalk directory services and the domain-management features of Microsoft Corp.'s LAN Manager and IBM Corp.'s LAN Server don't do much. LAN Manager required a custom patch to execute our multi-user database test successfully, and Banyan's Vines never got it right. All the major NOSes compromised their security features when dealing with Mac clients, and Mac-using administrators are locked out of most of the NOS' management applications.

Is the Mac itself the problem? We don't think so. Instead, we point the finger at the AFP (AppleTalk Filing Protocol), the part of AppleTalk that controls access to file servers.

Somehow Apple was able to convince the biggest names in networking to implement AFP on their servers rather than requiring NOS-specific drivers on each Mac. This strategy preserves the Mac's ease of use — all AFP servers look alike, regardless of the vendor — and eases the Mac manager's burden because no special client software is necessary. And relying on AFP should have simplified development, resulting in higher-quality products.

But it looks like this last part didn't work out.

In most cases, the AFP add-ons are far from perfect. The NOS vendors, stripped of their distinctive advantages when communicating with Macs, appear to have had little incentive to pursue excellence in Mac networking. The universal adoption of AFP has brought Mac users simplicity at the expense of features.

All of which indicates the importance of developing a robust, protocol-independent layer above AFP. A flexible, new driver layer should enable the NOS vendors to bring the full range of their services to the Mac desktop — starting, we hope, with improvements in such basic areas as file-server access and management. □

Commentary

Will Apple avert nightmare if it puts OS on Intel?

JEAN-LOUIS GASSÉE

The idea of running Mac software on an Intel-powered personal computer isn't new. It has been the topic of hot and recurring arguments inside Apple for a long time. If memory serves, it was first debated in 1983, several months before the Mac's January 1984 debut.

A decade later, the argument is settled. Nothing is shipping yet, but it appears that an Apple-engineered Intel port of the Mac system has found a sponsor: Novell Inc.

No exit. At first glance, the idea has potential. There are tens of millions of IBM PC and compatible clones out there. Imagine the Mac Finder running on even a small percentage of them. That could instantly double or triple the Mac's installed base.

In very real ways, Apple rides on the back of software developers. Their desertion has always been Apple's worst nightmare. So far, despite the seemingly inexorable logic of installed base numbers, developers still support Apple.

But the nightmare is still there. Apple's market share gains could be stalled, as a comparison between Mac units and x86 processors for the past year seems to indicate. Also, fewer applications are solely available on the Mac. This trend, aided and abetted by Microsoft Corp.'s efforts to seduce Mac developers and sometimes encouraged by Apple in the name of cross-platform availability, is a prisoner's dilemma.

And, for Apple, the only escape seems to be Novell.

PowerPC first. Conceivably, Novell could offer its customers NetWare, DR DOS and a Mac-like GUI running recompiled Mac applications.

Impressive. But to whom?

In theory, it's a simple port for a Mac application written in C or C++. In practice, it is never that simple, especially if, as rumored, the initial 486 Mac port is less than 100 percent complete. This is a sure way of turning Mac developers off. With the improved availability of cross-development tools, if developers want to maintain more than one version of their program, they might as well do Windows.

Speaking of which, there appears to be a fly in the ecumenical software ointment: It doesn't run Windows applications. You'd have to install the genuine Microsoft Windows environment anyway.

This is too complicated. If the idea is to bring the beauty and simplicity of the Mac to the supposedly less-refined clone world, this is an (oxy)moronic way to go.

It is also a rear-guard battle. At best, the Apple-Novell product will ship next year. By then, there might be two Windows NT versions, admittedly with some weaknesses in areas such as networking, and Chicago, a "mo' betta" 32-bit successor to Windows 3.1 no longer running atop a distinct DOS (meaning no more room for DR DOS under Windows).

Further, there is ample evidence that even such a talented engineering organization as Apple's can be overloaded. Products such as QuickDraw GX and AOCE (Apple Open Collaboration Environment) are several years behind schedule. A major development project such as the 486 port will suck resources away from even more important efforts.

The challenge isn't to keep developers on the Mac platform by also providing a kludgy way to run their wares on PC clones. Apple's most important task is to begin a successful transition of its business to PowerPC. No other success could save it from a failure to attract developers to the new and native features of the architecture. □

LETTERS

Customer Assistance Center receives well-earned praise

For years users and the trade press have lambasted Apple for its lack of end-user customer support. It seems Apple has changed its tune, but there hasn't been much credit given for the company's belated responsiveness.

After all the years of "Contact your local Apple dealer" as the only real response to requests to Apple for support, I recently decided to call its toll-free Customer Assistance Center. The last time I called this number was probably about two years ago, and I got no useful information (I already know the location of my dealer, thank you) and glumly accepted that Apple was simply not going to provide support.

What a pleasant surprise it was this time around! I called the number twice on the same day and got fast, accurate answers to several technical questions.

While other manufacturers explore cutting support, Apple seems to have finally gotten it right. Let's at least give Apple credit when it earns it.

Eric Jacobs, general manager
The Daily Pennsylvanian, Philadelphia

Unix can also teach lessons that are best left not learned

In The Mac Manager column (MacWEEK, April 12), Don Crabb said, "the complete manager should know some Unix," since Unix is "the benchmark real operating system."

While Unix has many advantages over other operating systems and might even be called the best among poor choices, there are some lessons best not learned from Unix at all. These include:

- **Lack of serious built-in security.** Although some are working on it now, security doesn't compare to that available in VMS.
- **Lack of standards.** How many versions of Unix are there?
- **Poor ease of use.** Try to explain the Find command to a novice.

Yes, there is a lot to learn from Unix, but passing it off as the only operating system worthy of study is a mistake.

John Shelton, Booz, Allen & Hamilton
Mountain View, Calif.

Fuji Photo Film clarifies role in Apple's photo future

As public relations counsel to Fuji Photo File U.S.A. Inc., we want to clarify some points in the story "Apple cameras will put snapshots on Mac desktop" (MacWEEK, March 22).

Specifically, Fuji has not entered into any agreement with Apple (either in Japan or the United States) to produce a digital camera using Fuji technology. Fuji currently sells the Fujix DS-H2 camera in Japan. It is not a PCMCIA-compatible product and, in fact, stores images on a flash-memory card that has a Fuji-developed 20-pin interface.

Finally, although the Fuji DS-H2 camera eventually will be sold in the United States, it may carry a different name in the U.S. market.

Bruce D. Bowman, senior vice president
Daniel J. Edelman Inc., New York

A Trik NetDistributor way out of the update quandary

Regarding the story "Are software upgrades automatic? Not all say yes" (MacWEEK, April 12), I agree that deciding whether to upgrade to the latest version of this or that software product is indeed a nasty and brutish business.

Unfortunately, it can also be a tremendously long process. This is where the story failed to mention one of the most significant time and cost-saving technologies available today: electronic software distribution products. The ability to upgrade several hundred Macs overnight radically reduces the huge costs associated with installing and upgrading software.

The story mentioned that the task of distributing software is probably the toughest question of all, but it didn't explain why. According to Data Communications magazine, a company with 2,000 desktop computers will spend an average of $1 million to maintain, distribute and upgrade software. This is 21 percent more than it will have spent to purchase the software licenses.

Most of that money is spent providing highly trained network specialists who walk around waiting to get into someone's office so they can double-click on an installer icon, choose the Install button then watch as the Mac's hard disk is packed with 3 Mbytes of tutorials.

Electronic software distribution products can shave up to 90 percent of this labor cost and cut installation time by a factor of 10. They often pay for themselves within the first minute of use. Our product, NetDistributor Pro, excels at handling the widely differing configurations on end-user machines. But there are other products from which to choose as well.

Throop Wilder, vice president of marketing
Trik Inc.
Austin, Texas

Send letters to MacWEEK, 301 Howard St., 15th Floor, San Francisco, Calif. 94105. MCI 323-1203; Internet, letters@macweek.ziff.com; fax (415) 243-3650. Include your name, address and phone number. Letters should not exceed 300 words. We reserve the right to edit for clarity and length.

The Mac Manager

Five industry problems worth griping about

DON CRABB

Several times during the past year I've asked you to send me your Apple wish lists, which I then consolidated and published here. Now it's my turn, but with a different spin. Rather than give you my Apple wish list, I'm going to air my top five gripes about our industry:

5. Developers who can't take criticism. No matter how brilliant the concept, no hardware or software is perfect the first time out; established products can usually benefit from customer critique, too. I'm really annoyed with developers who ignore their customers' complaints, or worse yet, indulge in on-line flames delineating the 50 ways the criticisms are meaningless and wrongheaded.

4. Erratic service from on-line services. When was the last time you logged onto an on-line service without a glitch? I rarely log on without problems, regardless of the service, the Mac or the access number. I can expect either to endure several redials before making a connection or having to reconnect because of errors from the host, not to mention watching while the service just hangs in midsession. It's time for each on-line service provider to improve its connection and service reliability.

3. Passing the compatibility buck. In the bad old mainframe days, when a part failed, you could expect your mainframe rep to place the blame squarely on the nearest third-party product to which the system was connected. We get the same runaround today from vendors who tell us that an obvious incompatibility is not their fault but the result of another vendor's interaction with the product. Developers should stop making excuses and start testing their products more realistically. Mac users don't work in a single-vendor vacuum.

2. Using Version 1.0 buyers as beta testers. Too many times in the past year I've unwrapped Version 1.0 software or hardware only to discover major bugs. In a rush to beat the competition to market, many vendors have shipped buggy products and, as a result, have forced us to be involuntary beta testers.

1. Version update mania. You know the drill: You buy Ultima Extra Plus (UXP), the latest utility from Super Software Corp. (SSC). Two weeks later, while hanging out on-line and browsing the SSC service forum, you notice the Version 1.1 UXP updater lurking in the forum's file area.

A couple of weeks after that you find the Version 1.1.1 updater in the same forum. Apparently SSC has gotten into "every time we kill a bug we will issue a new version" mode. The result is a major user dilemma: Do you download and install every updater you encounter?

Follow that procedure if you're interested in never getting real work done. Software companies need to know that while we won't tolerate being beta testers, we also don't have the time or inclination to play the update-of-the-week game. They should consolidate updates on a timely but manageable schedule and notify us about them directly. □

"This vacation, we're thinking tropical while keeping within cellular range."

Network Operating Systems

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Corporate computing managers are increasingly concerned about joining their Macs and PCs on integrated networks. MacWEEK and ZD Labs tested the leading network operating systems in a large, multiplatform environment and came up with some surprising results.

NetWare leads pack in NOS comparison

By Jonathan A. Oski

The deployment of cross-platform networks that seamlessly link Macintoshes and IBM PCs and compatibles is the dream and the nightmare of many network managers. Building these new networks translates into the aggregation of various fiefdoms of users who are currently linked by workgroup or departmental servers. This transformation of existing networks — or emergence of new ones — is leading many organizations to rethink the file server and network operating system decisions they made just a few years ago. With this in mind, we set out to examine six products that provide network services, predominantly file services, to a mixed client base of Macs and PCs.

In conjunction with Ziff-Davis Labs in Foster City, Calif., we compared Apple's AppleShare 3.0.1, Banyan Systems Inc.'s Vines 5.5, IBM Corp.'s LAN Server 3.0 Advanced, Microsoft Corp.'s LAN Manager for OS/2 2.2, Novell Inc.'s NetWare 3.11 and CoOperative Printing Solutions Inc.'s EasyServer Python. These products run the gamut from simple file servers to full-fledged network operating systems and range in cost from about $5,000 to close to $30,000, depending on the hardware platform used and the options installed.

Executive Summary

The dirty half-dozen. COPS' EasyServer can hardly be considered a NOS. So why did we consider it? Our past experience with the EasyServer line (when it was sold through ShirtPocket Software Inc.) was that it performed quite well, was very easy to install and was relatively inexpensive. This time, we chose the top-of-the-line Python for our tests. It is a prepackaged, "headless" (no monitor or keyboard

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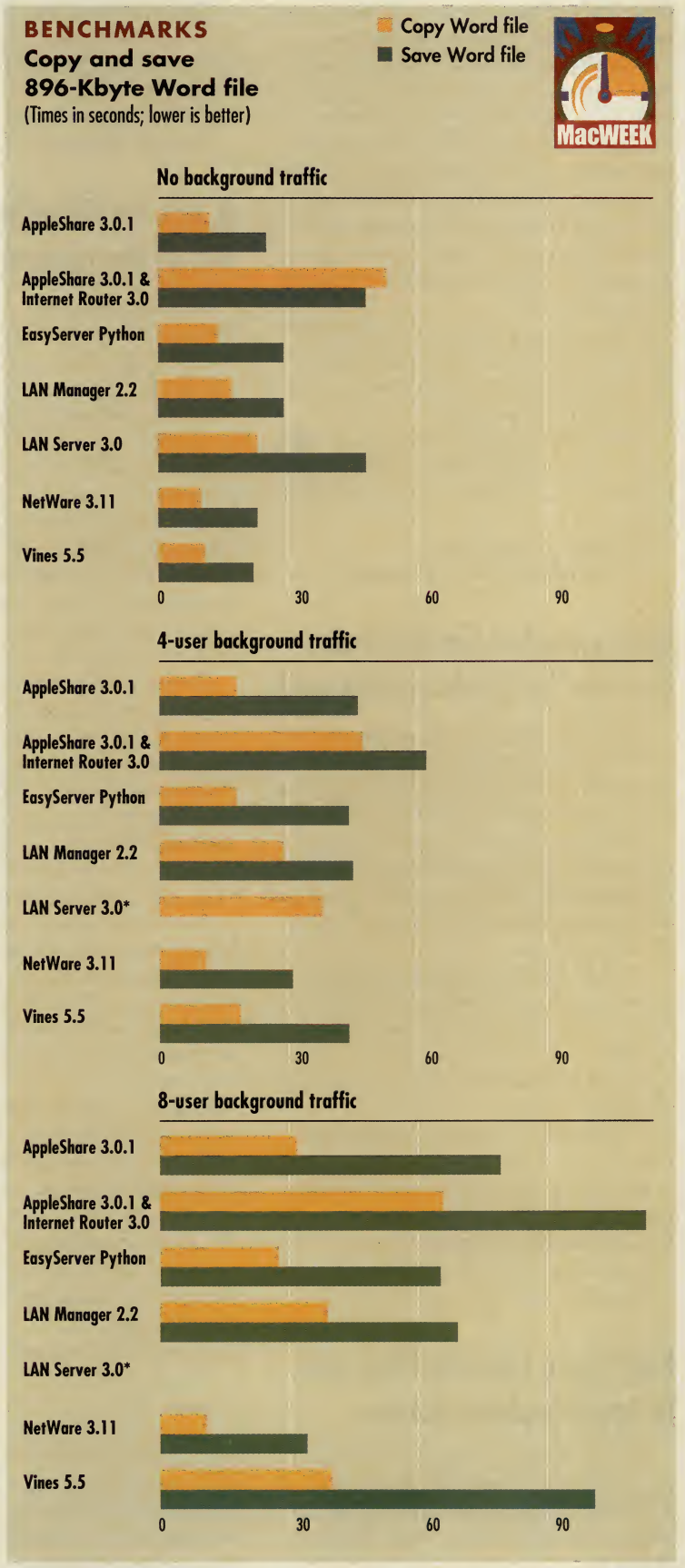
Contributors

MacWEEK would like to extend special thanks to all those at Ziff-Davis Labs in Foster City, Calif., who helped define and implement the NOS project and who valiantly put up with the rigors of this project. At the Labs, the project managers were Julie Baher and Robert P. Lipschutz; the technical specialists were Jessica Beyer, Eric Mitchell, Lori Mitchell, James Moratto, Camille Riddle and Orang Ryan Tabibian.



** LAN Server couldn't complete Save Word test in 4- and 8-user configurations and couldn't complete Copy Word file test in 8-user configuration.*

Labs testing uncovers surprises in performance

By Jonathan A. Oski

A sign we spotted on the wall of an auto mechanic's shop reads: "Speed costs money. How fast do you want to go?" We wondered whether the same holds true for network operating systems. If so, the high-priced, IBM PC and compatible-based NOSes would resemble nitro-rocket dragsters next to the economy-model servers we reviewed.

Performance

Performance is a prime consideration when you're selecting an operating system for an enterprise network, but performance alone should not dictate your decision. As we entered this review, we anticipated a set of testing numbers that could serve as a basis for comparing the raw performance of these NOSes. As it turned out, our performance testing was much more revealing than that, shedding light on many problems, shortcomings and nuances relevant to any large network.

The test bed. One of the principle objectives of our performance test suite was to eliminate external variables, such as hardware, wherever possible. Granted, AppleShare will not run on a PC, nor can you use a Mac as a server with Novell Inc.'s NetWare, but similar server configurations could be constructed on either platform. Likewise, we tried to populate our test bed with the cross-section of clients you might expect to find in organizations with a mix of Mac and PC workstations (see test configuration, next page).

Whenever we varied from our standard configuration, it was because of a NOS' lack of support for the standard we had chosen for our network and servers. For example, we split our Ethernet network into four equal segments for all tests, except for those on AppleShare and CoOperative Printing Solutions Inc.'s EasyServer, which do not support more than one network connection. Coupled with the Apple Internet Router, an AppleShare server can sit at the hub of four network segments, so we tested this configuration as well.

Another exception was in network interface cards. The current release of Vines has some documented incompatibilities when the AppleTalk option is used along with our card of choice, the Eagle Technology NE3200 32-bit bus-mastering EISA Ethernet adapter.

As a result, we were forced to use the Racal-Interlan ES3210 — a less-popular 32-bit EISA Ethernet adapter — for the Vines servers.

The application suite. To profile the performance of the six products, we did a series of six Finder and application tests on each one. We also used a multi-user database to test nine types of common database operations. Our Finder and application tests were selected to examine the behavior of the NOS under different circumstances representing some common business scenarios, especially those in which the Mac is prominent — graphics and publishing.

We performed all of our Finder and application tests under three sets of network conditions. Baseline performance was determined with no other induced network traffic present. Subsequent tests were performed with four and eight client nodes generating background network and server traffic. Unless otherwise noted, all 92 nodes in our test bed (48 PCs and 44 Macs) were logged onto the server for the duration of the tests. This imparts some background load on the server because AFP (AppleTalk Filing Protocol) periodically checks the presence of mounted network volumes.

File transfer performance was judged using four different Finder-copy operations. We measured the time required to copy 896-Kbyte and 32-Mbyte files from the client to the server. (We also tested Finder copies of 17-Kbyte files, but the results were so similar across NOSes and traffic levels we didn't bother graphing them.) We then measured the time required to copy a complex 11.2-Mbyte folder containing about 250 items (files, applications and nested folders) to the server.

PC-based NOSes typically split Mac files into two separate files, which represent the Mac file's resource fork and data fork. It's the job of the NOS to maintain the association between these two files, and the NOSes we tested did a good job of keeping this mechanism from view so that only one file appears to clients. Copying the complex folder is designed to tax the CPU as well as the disk and network interface of the server as it juggles directories of Mac files. Finally, we measured the

See Performance, Page 36

score card

Network operating systems

These six products provide services to today's cross-platform networks with Macintosh and PC clients. Two of them can best be considered primarily as file-server applications, while the remaining four are full-fledged network operating systems. The breadth of services offered range from simple file services to a full range of print, electronic mail, distributed global directory services and enterprise network administration.

AppleShare 3.0.1 and Apple Internet Router 3.0

Apple's stalwart file-server application has evolved only slightly since it was released in 1986. AppleShare's strengths are its ease of installation, administration and seamless integration with the Mac OS. Surprisingly, AppleShare on a Quadra 950 was able to hold its own with close to 100 clients on our test network. It lacks the integrated routing features found in the more expensive PC-oriented products, and performance suffered appreciably when used in conjunction with Apple Internet Router 3.0.

Vines 5.5, Vines Option for Macintosh 1.3

Banyan Systems Inc.'s Vines is easier to install and administer than the other high-end NOSes we examined. This is mainly because of StreetTalk, its world-renowned distributed directory service. Vines' performance is not up to par with that of its archrival, NetWare, and Banyan's stubbornness when it comes to writing drivers for server network interface cards prohibits use of some newer, high-performance bus-mastering and parallel processing cards. For enterprise networking though, Vines is hard to beat. Its strengths in a wide-area multiserver network are unmatched by any other product we tested.

EasyServer 1.6.2b6

CoOperative Printing Solutions Inc.'s EasyServer is not marketed to compete with the likes of NetWare; nevertheless, its performance as a file server remained respectable even when we scaled the number of clients to close to 100. Lacking any features other than file services, it is hard to call EasyServer a NOS, yet for instances where a low-cost file server with good performance is the main requirement, EasyServer deserves a look. COPS needs to clean up its documentation and offer a better, multiserver administration application for its products to remain competitive with forthcoming AppleShare products.

LAN Server 3.0 Advanced, LAN Server for Macintosh 1.0

Our experience with IBM Corp.'s LAN Server was fraught with frustration. Our tale of woe began with the installation and continued through our many attempts at running performance benchmarks. LAN Server supports AppleTalk on only one network interface card, which limits deployment on multiple LAN segments. Our inability to complete several tests on our 100-client test bed should be a caution to anyone considering this product. As we went to press, however, IBM showed us an update that allowed us to run our entire test suite and appeared to show improved performance. IBM hopes to get this quickly to market.

LAN Manager for OS/2 2.2, LAN Manager Services for Macintosh 1.0a

Microsoft Corp.'s LAN Manager offers basic file and print services to Mac clients. Although we had some problems during the database portion of our performance benchmarks, we were eventually successful with Microsoft's assistance. LAN Manager is based on Version 1.3 of OS/2, a product that Microsoft is shying away from as it readies the release of Windows NT. Installation difficulty was typical of what we would expect from a PC-based product. Lack of any Mac management component delegates the Mac to the status of second-class citizen on LAN Manager networks, however.

NetWare 3.11, NetWare for Macintosh 3.011

Novell Inc.'s NetWare offers the broadest cross-platform support of all the products we tested. NetWare was also the best-performing product, showing little or no degradation as additional users and traffic were added to the network. Installing NetWare is not something that can be taken lightly: The product is difficult to install and administer, but the Mac manager is more empowered than with any competing NOS. Novell is also demonstrating a vision with respect to the Mac becoming a full peer on IPX (Internetwork Packet Exchange) networks. These recent announcements should not be taken lightly when you're selecting an enterprise NOS. Banyan has yet to announce support for the Mac in its Enterprise Network Services add-on to NetWare, but the combination of the distributed directory power of StreetTalk with the performance and functionality in NetWare would make it a truly desirable solution.

	AppleShare	Vines	EasyServer Python	LAN Server Advanced	LAN Manager for OS/2	NetWare
Overall value	◆◆◆	◆◆◆	◆◆◆◆	◆◆	◆◆	◆◆◆◆
Version tested*	3.0.1	5.5	1.6.2b6	3.0	2.2	3.11
Performance	◆◆	◆◆	◆◆◆	◆	◆◆	◆◆◆◆
Installation	◆◆◆◆	◆◆◆	◆◆◆◆	◆◆	◆◆◆	◆◆
Features	◆◆	◆◆◆	◆◆◆	◆◆	◆◆	◆◆◆◆
Documentation/support	◆◆◆	◆◆◆	◆◆	◆◆◆	◆◆◆	◆◆◆

**Version of the base product.*
Versions for some of the Mac services are different and are included in the text above.

Pricing information for these products varies widely, depending on the network configuration.
Consult the Product Info on Page 52 for detailed prices.

RATINGS KEY

◆◆◆◆◆ *Excellent*
◆◆◆◆ *Very good*
◆◆◆ *Good*
◆◆ *Fair*
◆ *Unsatisfactory*

Comparison

From Page 32

is used) 486 PC clone running at 50 MHz. It contains 16 Mbytes of RAM — most of which is used for disk cache — and a reasonably fast, 16-bit, SCSI disk controller and network interface card. A software-only offering is available for those who want to supply their own server hardware, but to avoid any possible hardware conflicts, we chose the preconfigured model.

Apple's AppleShare 3.0.1 is a small step up from EasyServer in that it provides print spooling in addition to file services for your network. AppleShare is a software-only product that runs on any System 7-supported Mac. Like EasyServer, AppleShare is not in the same league as the rest of the products we looked at. Nevertheless, our research indicates that at companies with networked Macs, an overwhelming number use Macs as file servers — most frequently running AppleShare. Apple's plans for AppleShare have also not been thwarted by lofty product announcements from Novell (see NetWare 4.0 story, Page 35). New hardware and software products set to debut shortly will perpetuate the AppleShare legacy (see AppleShare Pro story, Page 38).

Moving into the big leagues, we examined a pair of products based on IBM's OS/2. From Microsoft comes LAN Manager 2.2. Based on the aging OS/2 1.3 that Microsoft co-developed with IBM and has since distanced itself from, LAN Manager is the precursor to Microsoft's network offerings under its soon-to-be-released Windows NT 32-bit operating system. From a Mac perspective, LAN Manager is functionally equivalent to AppleShare, offering only file and print services. However, NOSes such as LAN Manager differ from file-server programs in many areas. One of these is the ability to aggregate two or more servers into a common manageable system, which LAN Manager can do through its "domain" feature.

Unlike the file-server model where access is defined on a server-by-server basis, domains let you define access to a collection of servers as if they were one entity.

The other OS/2 offering was from Apple's pal of late, IBM. Based on the current Version 2.0 of OS/2, IBM's LAN Server 3.0 Advanced, when coupled with LAN Server for Macintosh 1.0, also offers no new functionality to Mac clients. As with LAN Manager, groups of LAN Server servers can be grouped into domains to facilitate system administration and management.

Now we moved on to the big guns: Banyan's Vines and Novell's NetWare. Vines stands apart from other NOSes with its global, distributed directory service, StreetTalk, which lets you go beyond the concept of domains and view and manage large networks of 500 or more servers as one system. Vines offers some additional Mac client functionality in the form of mail and utilities applications. With the mail client, Mac users can exchange mail with DOS, Windows and OS/2 clients using Banyan's robust Intelligent Messaging Service. The utilities application lets users send and receive messages and manage security at the file level on any accessible Vines server.

Finally, NetWare 3.11 combined with NetWare for Macintosh 3.011 extends Novell's high-performance file services to Mac clients. NetWare's reputation is built on performance, as it consistently outpaces all other products on the market. Built on a proprietary, 32-bit operating system, NetWare also offers the broadest level of functionality to Mac clients. With the full suite of Mac-oriented NetWare utilities installed, a Mac administrator can configure user accounts, manage file and volume security, and control network print queues.

Madness of our method. Our test objectives were twofold. First, we wanted to see how easy — or difficult — it was to install and manage these products. Realizing that for Mac-centric organizations, PC-based installations would present a challenge, we wanted to see if the administration and management advantages offered by these industry-strength NOSes would offset the difficulty of learning a foreign hardware and software system.

The other test objective was performance. Using a nearly 100-node network comprising both Mac and PC clients, we wanted to see when the low-end systems would hit the wall and if the high-end systems could justify their premium prices. Using a medley of application tests and varying amounts of background traffic, we measured the performance of each product on ZD Labs' Ethernet network. To ensure a level playing field, we chose equally prepared, high-performance PCs as our server platforms. When possible, we divided our network into four segments to reduce contention for the network and maximize server performance.

Installation, administration and management. To ensure equally rigorous testing for all of the products, we prepared detailed scripts that specified exactly how each NOS should be tested. Starting with the management scripts, we installed the servers and created a simple organization of users that resembled that of a small company or corporate department. As expected, we found a world of difference between the Mac-centric file-server products — EasyServer and AppleShare — and the primarily PC NOSes — LAN Manager, LAN Server, Vines and NetWare.

The file-server products were easy installations: After reading their brief manuals, you can install the products in well under an hour. The PC-oriented products ranged in complexity from moderate to nightmarish, owing at least some difficulty to hardware setup alone. Although the Vines documentation could fill the back of a small pickup truck, it was generally the easiest to install because you don't have to edit system configuration files manually. The remaining three products all demand careful readings (and rereadings) of the manuals, as well as cryptic edits to critical configuration files to get the server to start up properly. LAN Server was the least forgiving: If you make a mistake while installing it, chances are you'll have to start all over again.

Once you install the servers, the procedures for maintaining user accounts are fairly simple for all products. Network administration can be performed only from Mac clients with NetWare and EasyServer. The domain-style management features of both LAN Server and LAN Manager offer nothing to Mac users, since they must have accounts explicitly defined on all servers. Over time, we expect most network operating systems will acquire the benefits of a global directory service such as StreetTalk, especially as their networks grow to multiserver, multisite enterprise systems. NetWare offers the most functionality to Mac clients, but Novell's user interface will take some getting used to.

All of the PC-oriented products let you specify security at the file level — a more granular and flexible model than the folder-level security implemented in AppleShare and EasyServer. After completing our management scripts, we concluded that the primarily PC NOSes offer a great deal more functionality than the file-server products, but they're also much more difficult to learn and use. For our single-server, 100-node network it would be hard to justify the advantages of these more expensive systems.

Next we took the products down to the test track to see who could prove their mettle on our performance script.

The hot seat — performance. We faced more than a few challenges when we tried to log close to 100 nodes onto each of our test servers. We had problems with virtually every product we brought into the lab. Some were quickly resolved by new software from the vendor; others have yet to be corrected. Products such as LAN Server required daily calls to IBM technical support for suggestions on

Standardized test bed levels out the NOS playing field

For our tests, we tried to maintain as much consistency as possible among the server platforms. An identical 1-Gbyte Seagate Technology SCSI disk drive was used with all six products. For IBM Corp.'s LAN Server 3.0 Advanced, Microsoft Corp.'s LAN Manager for OS/2 2.2, Banyan Systems Inc.'s Vines 5.5 and Novell Inc.'s NetWare 3.11, we used a Systempro/XL 486 DX/50 from Compaq Computer Corp. All of these servers used Adaptec Inc. 1740 SCSI disk adapters, although Vines 5.5, had to be set to Adaptec 1540 emulation mode. All of the Systempros, except the one used for LAN Manager, and the Apple Macintosh Quadra 950 used for AppleShare 3.0.1, had 32 Mbytes of RAM installed. LAN Manager 2.2 is based on OS/2 Version 1.3, which does not support more than 16 Mbytes of RAM. CoOperative Printing Solutions Inc.'s EasyServer Python is also limited to 16 Mbytes of RAM.

In the NICs of time. Four Eagle Technology NE3200 Ethernet adapters were installed in each of the Systempros except the Vines server, which does not currently support AppleTalk on this adapter. For Vines, we used an alternative, Racal-Interlan's ES3210. In the AppleShare server we used the built-in Ethernet interface and three Asanté Technologies Inc. MC+IIET64 NuBus Ethernet adapters. The EasyServer Python is preconfigured with an Adaptec 1520 SCSI adapter and a 3Com Corp. 3C503/16 Ethernet card.

Our 10BASE T Ethernet network used Cabletron Systems Inc. Multi Media Access Center (MMAC) hubs and TPMIM Ethernet modules. The NE3200 adapters, which do not have an on-board 10BASE T port, were attached to our test network using Cabletron TPT-4 AUI (attachment unit interface)-to-10BASE T transceivers. The test bed's Ethernet network of 92 client workstations was divided into four segments, each with 11 Macs and 12 IBM PCs and compatibles.

The players. We used a variety of client workstations to simulate the heterogeneous mix you might find on any network: This helped ensure that all of the workstations wouldn't execute the background tasks with equal fervor. We used a mix of Mac IIci and IIsi machines, LCs, and Quadra 700s to represent the Mac contingent. For the role of PC client, we used 386 and 486 PCs, ranging in speed from 20 MHz to 33 MHz, from Dell Computer Corp., Compaq and Gateway 2000 Inc. All of the PC clients were installed with Eagle Technology NE2000 Ethernet adapters.

We gave a description of our test bed and testing methodology to all of the vendors whose products participated in this study so they could supply tuning parameters for their products — an opportunity that was moot for products such as AppleShare and EasyServer, which don't let you perform any special server tuning. For the remaining products, however, this allowed the vendors to put their best foot forward and helped reduce the time required to optimize each server before performing our tests. — By Jonathan A. Oski

ED CALDWELL

The NOS crew at Ziff-Davis Labs in Foster City, Calif., includes: (seated from left) Camille Riddle, Lori Mitchell and Julie Baher; (standing from left) Eric Mitchell, Jim Moratto, Jessica Beyer, Orang Ryan Tabibian and Robert P. Lipschutz.

how we could just get all the clients connected to the server — let alone run the performance script.

Apple's AppleShare was the least troublesome server. We tested AppleShare in two configurations. First we had all the clients on one LAN segment, since the Mac does not normally support multiple active network interfaces. Later, we added Apple's Internet Router 3.0 to the server so we could rerun our tests using the four-segment network we had used for the PC-based NOSes. We found the Apple Internet Router added substantial overhead on the server, causing a performance degradation by as much as fivefold even when no routing was going on.

Neither AppleShare nor EasyServer explicitly supports PC clients. To test these products on our cross-platform network, we installed Farallon Computing Inc.'s PhoneNET PC, which loads the AppleTalk protocol stack on PCs and allows them to access AFP (AppleTalk Filing Protocol) and Printer Access Protocol network services.

EasyServer, although capable of supporting only one LAN interface, held its own throughout the tests, bettered only by NetWare in most instances. NetWare lived up to its reputation as a speed demon, consistently outperforming all of the other products and showing little or no effect from increased background traffic. Vines and LAN Manager showed average performance, bettering AppleShare in some tests while losing in others. LAN Server remained a problem throughout our tests despite repeated attempts by IBM to correct the problems. Of all the products we tested, LAN Server is the only one we can unequivocally recommend that you steer clear of in its current offering. IBM and Miramar Systems (developer of the Mac client) have been working hard to improve LAN Server's performance. As this review went to press, IBM showed us a version of LAN Server that had improved performance in a limited test.

If we had to do it again. Any time you try to break new ground — as we have done with this cross-platform NOS comparison — you're apt to consider things you would do differently the second time around. For instance, one-server networks are quickly giving rise to multiserver networks. We would have liked to have tested the implications of installing and managing multiple servers in campus and wide-area network configurations. These tests would help exhibit the strength of NOSes over file servers and also the importance of distributed directory systems.

Our performance tests would have benefited from the addition of some other metrics and increased background load. As we learn the idiosyncrasies of how the Mac behaves with respect to networked file volumes and server performance tuning, we hope to be able to offer more qualified representations of network server and operating system performance.

Until such time, NetWare is our pick for sites that are not averse to learning an unnecessarily complex product. It consistently offered the best performance of the lot and gives Mac users the widest array of network administration and utility applications. For Mac-centric sites, both AppleShare and EasyServer held their own on our test bench. Neither product offers the breadth of network services included in the PC-oriented NOSes, but both are a snap to install — which is the way it should be. □

NetWare 4.0 will deliver loads of new services for clients and administrators

We reviewed Novell Inc.'s NetWare 3.11 and NetWare for Macintosh 3.011 (the NetWare Loadable Module required to support AppleTalk networks and Mac clients). Novell's recently released NetWare 4.0 was not ready in time for our Labs testing.

Just like its predecessor, NetWare 4.0 requires a Mac-specific NLM, but Version 4.0 of the Mac NLM will not ship until later this month. Even then, not all the whiz-bang features Novell has added to the NetWare 4.0 core operating system will be available to Mac clients or managers.

Waiting game. NetWare 4.0 has been retooled to support larger networks and more users per server. Aside from this basic improvement, the biggest Mac advantage in Version 4.0 will be enhanced configuration utilities for Mac managers. For Mac clients, there will be a series of new tools sharing a Mac-like graphical feel that Novell said will enhance users' views of the network and their ability to manipulate services such as printing.

Directory services, one of the main NetWare 4.0 enhancements available to DOS, Windows and Unix clients, won't come to the Mac until the beginning of 1994. Novell plans to release a gateway at that time that will give clients access to both NetWare 4.0's directory services and AOCE (Apple Open Collaboration Environment) directories. Additional products, which Novell is calling NetWare System Services for Macintosh, will give Mac clients' networks native access to NetWare 4.0 services via IPX (Internetwork Packet Exchange).

For now, however, Mac managers can look forward to these benefits coming in the Mac NLM 4.0:

- Support for AFP (AppleTalk Filing Protocol) 2.1 will enable the server or administrator to broadcast messages, such as server shutdown warnings, without an extra client extension.
- A new scheme for mapping AppleShare security privileges onto NetWare's as well as improved password-error reporting will simplify access management.
- The console utility for configuring AFP will be improved to give network managers more options when adding Mac clients to the network.
- File-name extension mapping will be supplemented with a client utility. Individuals will be able to override the server's default mapping settings, and users will be able to double-click on DOS files already copied from the server.
- The Mac's hierarchical file system format will be added to NetWare 4.0's support for CD-ROMs. Discs will be accessed at "closer-to-server" speeds, Novell said. A "migration" feature will let administrators set up rules whereby seldom-used files are moved to slower storage devices, such as tape, and often-used files are moved from slower media, such as CD-ROM, to faster ones.

Printing perks. With Mac NLM 4.0, AppleTalk network printers will be supported by PSERVER, the print-server NLM Novell includes with NetWare. Currently PSERVER spools only to printers connected to the server's parallel or serial ports. Novell said it will also improve how the printer NLM handles multiple versions of Apple's older Laser Prep; users will no longer have to wait while a printer resets itself.

Included with the Mac NLM 4.0 will be administrative tools that let Mac clients better manipulate spooling functions, such as scheduling, and halt print jobs in progress.

The print utilities are part of a larger set of tools to be bundled with the NLM that will give a user-accessible graphical interface to a variety of NetWare-specific capabilities, such as setting up and delegating Trustee rights. Administrators will retain ultimate control, however.

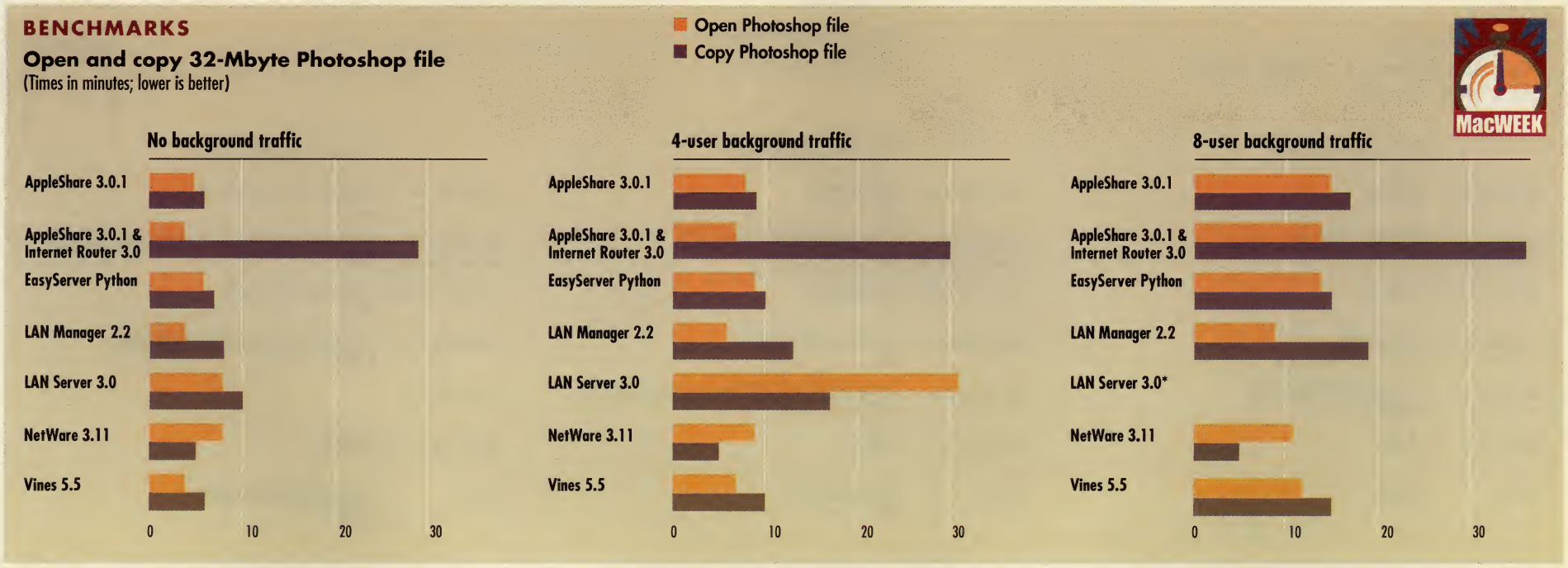
AppleTalk by Novell. The AppleTalk-routing functions built into NetWare will be disabled by default in Version 4.0 — a setting requested by many managers, Novell said. Router performance will be improved, but the company would not specify by how much. The new router software will also support Fiber Distributed Data Interface networks, in addition to Ethernet and token ring.

Many of these improvements will eventually be included in an upgrade to the Mac NLM 3.011, although Novell is reluctant to say which ones. The printing and other administrative utilities will ship at about the same time as the Mac NLM 4.0 and will cost about $50 per site, the company said.

NetWare 4.0 remains one of the more expensive network operating systems available. For $6,295 you get a 50-user license, $8,795 lets your server maintain 100 user accounts, and if you want to support 1,000 users on one server — only possible with Version 4.0 — you're looking at a $47,995 list price for the software. Novell has not announced a price for the Mac NLM 4.0. — By April Streeter

BENCHMARKS

Open and copy 32-Mbyte Photoshop file
(Times in minutes; lower is better)



** Couldn't complete tests in 8-user configuration.*

Performance

From Page 33

time required to delete this folder.

Our application testing examined file retrieval and storage performance using Adobe Photoshop 2.0.1 and Microsoft Word for the Macintosh 5.1a. We timed opening a 32-Mbyte file using Photoshop and saving a 896-Kbyte file using the Save As command in Word.

Database performance. Knowing that network servers are commonly used to store multi-user databases, we used an application created with Version 2.2.3 of ACI US Inc.'s 4th Dimension to test performance. Nine operations — searching, sorting, mass updates, array handling, transactions, importing, deleting, record locking and data entry — were performed by our automated test application. Our database tests were run with one, two, three and four clients concurrently accessing the database.

> NetWare proved that it could really handle the pressure — its performance curves were the flattest of the bunch as we increased the load on the server.

Throughout our tests, we attempted to minimize the effect of disk caching within the server by performing nonsequential iterations of each test. This procedure was designed to flush the server's disk cache after each operation by filling it with new data in each instance.

Obviously, there are a plethora of other tests we could have performed. As we were moving into uncharted territory, setting up a test bed with close to 100 Mac and PC clients (a configuration that, in many cases, even the vendors hadn't tried), we didn't anticipate the problems we would encounter just getting all the nodes connected and logged onto the respective network servers.

This resulted in many calls to the vendors — every one of them, in fact — to ensure that our tuning parameters were set properly or to help determine why a product would not work. IBM candidly admitted that it had tested LAN Server for the Mac with no more than five concurrent Mac clients.

How they fared. NetWare's reputation preceded it, and it did in fact perform best on most of our tests. NetWare proved that it could really handle the pressure — its performance curves were the flattest of the bunch as we increased the load on the server. Much to our surprise, AppleShare was able to hold its own during many of the tests when unencumbered by the Apple Internet Router, outperforming products costing eight to 10 times more.

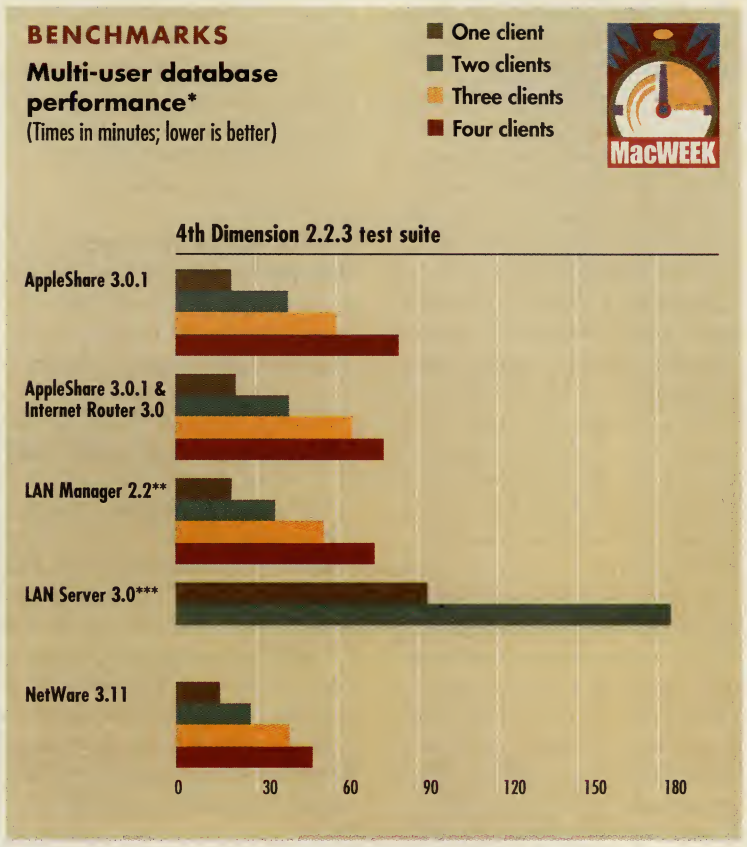
With the exception of LAN Server, which barely limped through our tests, AppleShare coupled with the router, however, was the bottom of the barrel in measured performance. Apparently, the router's overhead on the server is quite significant, even though there was very little routing going on in our test bed.

Certain products shone under limited circumstances. For example, LAN Manager exhibited the best overall performance in our Photoshop tests but finished near the bottom of most others. Vines' performance was not stellar in any test, but overall it remained competitive. This may have been because of the different network adapters we had to use for our tests — it is to Vines' distinct disadvantage that it doesn't support third-party adapter drivers.

EasyServer also did remarkably well, considering it was never intended to serve as many as 100 clients — something stated in no uncertain terms by COPS. EasyServer faced all traffic over one 16-bit network adapter and had half the RAM of most of the other servers, yet it consistently finished better than half of the other products in our tests. This reconfirmed our opinion that EasyServer is a great product for people looking for an inexpensive, file server-only solution.

Some no-shows. LAN Server was the source of repeated frustration throughout our NOS examination. As you'll see in the performance charts, we were unable to complete some of the tests on LAN Server with even limited network traffic. Simply connecting the 92 nodes in our test bed to LAN Server presented a formidable challenge. Since LAN Server does not support AppleTalk on more than one of the server's network interface cards, all Macs were logged onto the same LAN segment. After weeks of trying — and weeks of help from both IBM and Miramar Systems (authors of the LAN Server for Macintosh code) — we were able to connect 43 Macs to the server. The 44th never quite made it.

LAN Server was not the only source of headaches on our performance test bed. Banyan Systems Inc. was unable to provide us with a method to run our database tests on Vines. Likewise with EasyServer — you'll note their conspicuous absence from our database test results. We had some minor problems with both LAN Manager and NetWare, but they were quickly resolved by the vendors. Of all the products, AppleShare by itself was the only server that did not suffer any noteworthy problems during our performance tests.

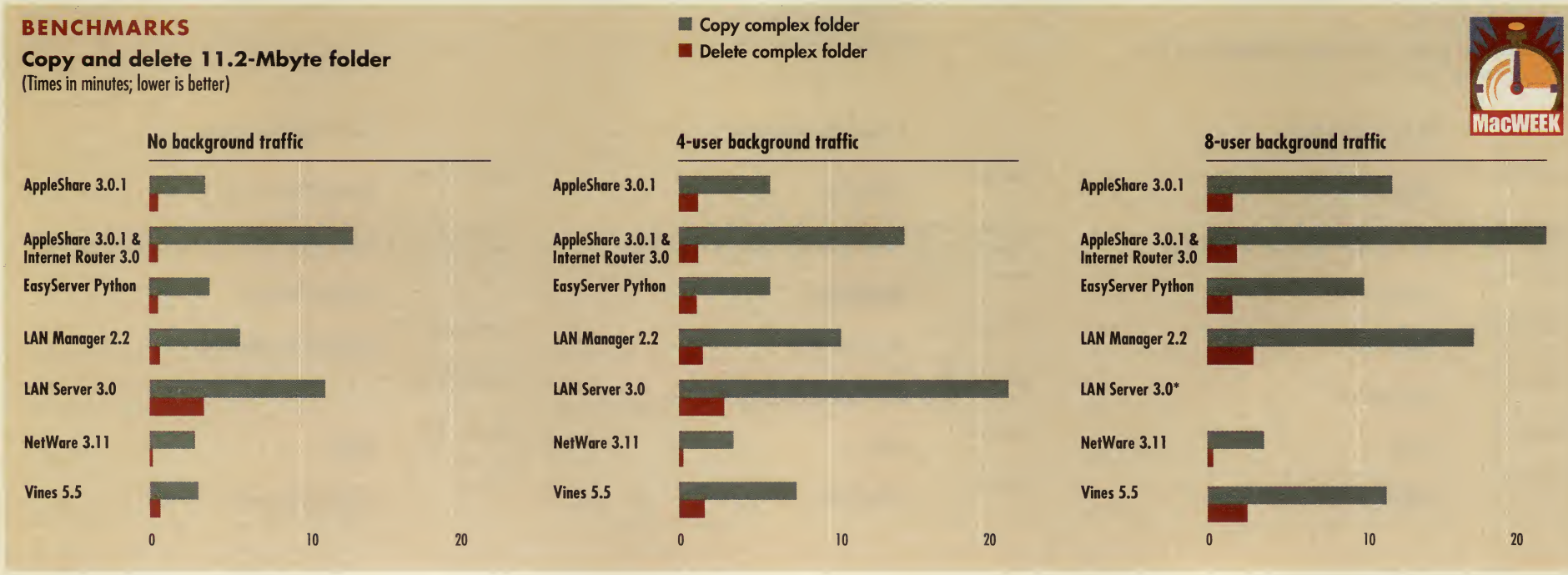


**Banyan Vines and EasyServer Python couldn't perform the test suite in any configuration. **LAN Manager's Services for Macintosh 1.0a required a custom software update to perform test suite. ***Couldn't complete tests for 3- and 4-client configurations.*

Conclusions. In addition to benchmarking NOS speed, our performance tests served as a real proving ground for these products. It's safe to say that the problems we encountered are not unlike those a network administrator would experience when setting up a mixed-platform network of similar magnitude. We feel confident that NetWare could easily handle additional load and deliver performance consistent with what we observed.

The performance curves for the remaining products, on the other hand, tended toward a logarithmic decrease in performance as load was added. Additional tuning is certainly possible with most NOS products, and this might lead to somewhat different results given a different application test scenario.

However, we think it's important to keep our performance results and testing maladies in proper perspective. They should be one factor in selecting a network operating system — but only one. □



** Couldn't complete tests in 8-user configuration.*

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Where the real work begins: Managing your network OS

Does it take a wizard just to delete or add a user or print queue? Time is money in net management.

JEFF QUAN

By Jonathan A. Oski

Management

Unlike the transitory blood and sweat of installation, management hassles will stay with you as long as you have your LAN.

Network administration encompasses entering and changing accounts, installing patches and upgrades, maintaining security, tuning performance, and troubleshooting.

Of the six network operating system products we tested at Ziff-Davis Labs in Foster City, Calif., only three allow you to perform any network management from a Mac client: Apple's AppleShare, Co-Operative Printing Solutions Inc.'s EasyServer Python and Novell Inc.'s NetWare. The others — Microsoft Corp.'s LAN Manager, IBM Corp.'s LAN Server and Banyan Systems Inc.'s Vines — require that you administer your NOS from an IBM PC or compatible client or directly at the server, which is a hassle for Mac-based administrators.

During our testing, we paid close attention to basic network management of organizational dynamics, such as moving, adding, changing and deleting users. In addition, we looked at performance-monitoring and troubleshooting tools, as well as network service management utilities.

All of these factors will come into play in most organizations. Hearty network-management tools allow you to perform these tasks with minimal effort. Missing or inadequate tools make a NOS a burden to administrators and clients alike.

Ever-changing organization. Some organizations are more dynamic than others, but inevitably, new people are hired; people change jobs, desks and names; new departments are formed; and user requirements constantly grow.

Generally, setting up new users is not difficult with any of the systems we tested. But if a NOS requires that you re-create user accounts and groups each time a user is promoted, this can become a full-time job. The systems we tested covered the spectrum in terms of ease of network administration. When available, the NOS' directory services (sometimes called naming systems) helped to maintain group and account structures across multiple servers. Where no such system exists, expanding a network is much more difficult.

Time for a change. In our simplest test case — where an employee's name has changed — it's easy to see how directory services will affect the administration of even a small, three-server network. If you assume that the employee needs to access all three servers, most of the products will require that you manually change the user account on each server.

However, if you are using the "domain" features of IBM's LAN Server or Microsoft's LAN Manager and the user has a domain-based account, changes are reduced because the domain account can cover access to all three servers. The catch is that this feature applies only to PC users because the domain features aren't available to Macintosh clients, which strikes this feature from the credit column of Microsoft's and IBM's ledgers.

Street rap. Banyan's Vines is the only product that can make a change like the one described above in one step, regardless of the size of your network. This is thanks to StreetTalk, Vines' distributed directory services system. With Vines, you have only one account on the entire Vines network. All user privileges are granted based on that single account.

Vines also has a nice associated alias feature called Nicknames. Any number of Nicknames can refer to objects in the StreetTalk database. For example, a user's full account name might be "William J. Smith@Accounting@Super Widgets," but he could be referred to as "Bill" by members of his group or any other groups where the Nickname has been added.

LAN Server has a similar function called Aliases, which are more limited — only one can be defined for any individual — but they do allow you to specify a Mac's Owner Name as an alias, so users won't have to rekey their network account names every time they mount a volume.

See Management, Page 40

AppleShare is getting married to Unix

In March, Apple announced two new versions of AppleShare that supplement the version reviewed here. AppleShare Pro, which shipped last week, runs on top of Unix on a Quadra 950 and requires a special add-in card to boost I/O performance; the total package is called an Apple Workgroup Server 95.

AppleShare 4.0, which is due out next month, runs on any 68040-based Mac and is available in bundles with a Centris 610 and Quadra 800, called Apple Workgroup Server 60 and 80, respectively.

Neither of these new versions was available for testing, but as soon as possible, we will test the AWS 95 with the same benchmarks used in this review.

Look ma, no Finder. The AWS 95 is a radical departure for Apple. It's the only Mac with special hardware for better network performance, and it's Apple's first A/UX-based network service.

The setup includes Dantz Development Corp.'s Retrospect Remote 2.0 — the first time automatic backup capability has been included with an Apple server. And AWS 95 servers can come with internal digital audio tape drives, which marks the debut of an Apple-labeled high-capacity tape mechanism.

If you've got a Quadra 900 or 950 already, the AWS 95 upgrade will cost $2,499 for AppleShare Pro, A/UX 3.0.1 and the I/O card and $4,399 for the above plus the DAT drive. Preconfigured AWS machines start at $7,589 for a Quadra 950 with 16 Mbytes of RAM and a 230-Mbyte hard disk, and they go up to $12,839 for a file server with 32 Mbytes of RAM, a DAT drive, a 1-Gbyte hard disk and extra caching RAM in the I/O card. (Slightly different hardware configurations and prices are available for an AWS 95 meant to run Oracle Corp.'s Oracle7 database manager.)

AppleShare 4.0 will cost $1,899 for the software alone. According to Apple, this version will be optimized to run on the '040 CPU and include better caching algorithms, making it two to three times as fast as Version 3.0.1.

Heirs apparent. Apple seems to be getting serious in the server arena, but it is not shooting for the high end or for cross-platform networks. Even the top-of-the-line AWS 95 is intended for a maximum of 200 clients, only 50 of whom are active; Apple claims the server is four times faster than the current AppleShare.

The AWS systems do have Mac-like, friendly interfaces for administration, making them potential successors to AppleShare 3.0.1 for mostly Mac sites that want better performance.

Apple said it will continue to support AppleShare 3.0.1, including bug fixes if necessary, but that no new features will be added to the 68030-based server software. — By Stephen Howard

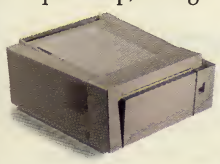
"HOW I DISCOVERED QUICKEYS™ AND SAVED THE EARTH"

It all started last June

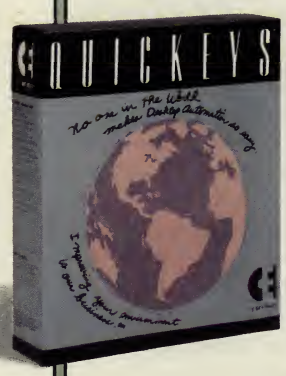
here at Earth Lovers Landscaping, when I discovered money doesn't grow on trees. So I went digging for ways to save money and make the Earth a better, more profitable place. Which is how I found QuicKeys. With QuicKeys I have replaced repetitive tasks I perform all day – every day – with a single keystroke or a mouse click. QuicKeys allows me to plant lots of time-saving and money-saving shortcuts directly into my business.

"Earth Lovers Landscaping" is a whopping 22 keystrokes. QuicKeys can save one week a year by typing it in just one keystroke.

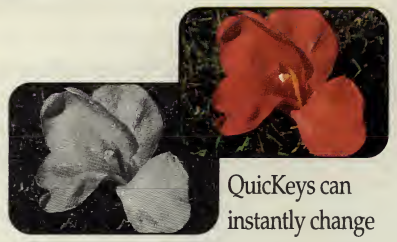
When it's time to fax Earth Lover's designs or quotes to customers, they use QuicKeys to switch from printer to fax modem in one quick step, saving 20-25 seconds each time – that's 2.5 days a year.



*Time savings are all based on a 10-person office.



Earth Lovers' employees can launch applications with one keystroke, saving 5-10 seconds every time, or 2.5 weeks a year.



QuicKeys can instantly change control panel settings. Each time Earth Lover's landscape designers change the number of screen colors displayed, they save 25-30 seconds. This one shortcut adds up to a savings of three days a year.

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Management

From Page 38

Cross-platform extensions. There is a big difference in the way PC and Mac operating systems associate documents with the programs that create them. This allows the computer to launch Microsoft Word when you double-click a Word document, for example.

PC applications typically use a three-character file-name extension (such as ".XLS") to indicate the creator of a file. Macintosh programs use Type and Creator identifiers (which are generally invisible to users) to associate files with appropriate applications. This information is also used by the Finder to display appropriate icons for different files.

On a network with a mix of PC and Mac clients, users will want to share files between compatible applications, such as Microsoft Excel, which is accomplished through a feature called extension mapping. This feature is offered by LAN Manager, LAN Server and Vines and allows you to associate a particular three-character file extension with a Macintosh Type and Creator.

IBM has paid close attention to this much-needed functionality. LAN Server allows extension maps to as many as eight characters. This facilitates sharing with OS/2 HPFS (high-performance file system) users, whose name space is not restricted to DOS' 11 characters, and mainframe data, where multiple levels of file names are common. LAN Server is also the only product that applies extension mapping dynamically.

For systems that do not offer extension mapping, low-cost programs, including Apple's Macintosh Easy Open, Dayna Communications Inc.'s DOS Mounter and Insignia Solutions Inc.'s AccessPC, can help fill the void. NetWare 4.0 is also expected to include this capability (see story, Page 35).

LAN Manager will not change the mapping on existing files, even if you change their extensions, and Vines requires you to stop and restart AFP (AppleTalk Filing Protocol) service before the changes to the extension map will be seen by your Mac users.

Keeping a lid on. Managers are inevitably faced with maintaining file security. If you need to maintain separate accounts on each server in your enterprise, you also have to ensure that access rights tied to individual accounts are synchronized despite changes. Third-party tools designed to ease the burden of security management are one option. NetWare users have a vast array of third-party utilities, usually DOS-based, that help with account maintenance. AppleShare administrators have a few tools to choose from, including Technology Works Inc.'s GraceLAN Server Manager and Sonic Systems Inc.'s Server Sentry. These tools can help, but they do not replace the functionality provided by a directory service such as StreetTalk.

Another area of network management focuses on monitoring server performance and resources. All of the products tested provide you with disk-utilization statistics for the server and information on current users. This is generally the limit of the information provided by COPS' EasyServer and AppleShare. The PC-oriented NOSes provide additional information — including statistics on CPU utilization and percentage of disk-cache hits. This information is helpful to the network administrator in performing server tuning. When used with other statistics that the PC systems supply, this data can be helpful for server load balancing and determining the need for additional hardware. It would be nice if Apple and COPS supplied more data to help administrators manage their server usage as well.

The network. Aside from managing the server and organization, network administrators also need to concern themselves with the network itself. Problems on the wire or at the protocol level sometimes manifest themselves in the appearance or disappearance of zones, servers or other network resources.

PC-oriented NOSes, especially Vines and NetWare, give the network administrator a wealth of information regarding topology and network- and protocol-specific statistics. This data lets you spot flaky network interface cards, malfunctioning routers, wiring problems and configuration errors. This information is invaluable for troubleshooting problems. Vines, NetWare, LAN Server and LAN Manager offer varying degrees of this feedback. Third-party tools, including protocol analyzers such as The AG Group Inc.'s EtherPeek, help fill the void for EasyServer and AppleShare, but to date, these products provide only network traffic analysis.

Scriptless log-on. None of the NOSes offers log-on scripting on Mac clients. For PC clients, log-on scripts are used to automate the connection process. With scripting, commonly used network services are automatically accessed during log-on. This feature is provided using either batch or command files, or with a script that is integrated with the user's account. For example, PC users may be connected to a variety of file, print, 3270-terminal emulation and electronic-mail services whenever they log onto the NOS from a workstation.

The only Mac counterpart to this is the ability to select server volumes to be mounted when the Mac is started.

The ability to script connections to a variety of network services would ease the burden on network administrators, particularly when helping users access services from their Mac using a variety of different interfaces.

Mac as manager. Another component of network management that can make a big difference is the capability to use a Mac client as an administrator or network-management station.

Of all the NOSes tested, Novell's NetWare provides the most complete suite of network-management tools for the Macintosh client. A NetWare administrator working on a Macintosh client can control print queues, user accounts, server volumes and file-access privileges. Mac-centric managers hoping to reap the benefits of NetWare but wary of shackling themselves to a PC will find solace in this feature. Those same mouse-ish managers will have to be led kicking and screaming to the keyboard when they catch sight of the command-line administration used by the other PC-oriented products.

> The ability to script connections to a variety of network services would ease the burden on network administrators.

Ironically, NetWare's PC interface is probably one of the ugliest on the market, offering very little in terms of menu-driven access. For LAN Server, Vines and LAN Manager, the PC- or server-based management is at least menu-driven to help simplify these tasks.

Vines and AppleShare offer minimal management capabilities from the Mac, limited to assigning file-access rights. LAN Server and LAN Manager offer no management tools that run on Mac clients, and in the case of LAN Server an OS/2 workstation is required as a management platform.

Although the EasyServer is managed entirely from a remote Mac, the breadth of services offered by the EasyServer is substantially less than the other products we tested. □

Little secrets and tidbits about the NOSes we tested

AppleShare

- AppleShare is the only product we tested that allows you to disable the "Remember name and password" feature of AFP (AppleTalk Filing Protocol). This is a good security measure that prevents people from logging onto an AppleShare server by simply restarting someone else's Mac.
- The Apple Internet Router 3.0 requires AppleTalk 58.0, but it is not included with the product. Make sure to get Version 1.3 of Apple's Network Software Installer if you plan on using this router.
- Apple Internet Router degrades AppleShare performance by close to 100 percent when installed on the same server Macintosh; that is, with the Internet Router installed, our tests took almost twice as long.

EasyServer

- Make certain that the EasyServer's start-up floppy disk is not write-protected. If it is, you will encounter all sorts of problems, and none of your configuration information will be saved.
- CoOperative Printing Solutions Inc. claims emphatically that it does not cater to large organizations, yet the EasyServer performed quite admirably in our tests, and there is not an easier product to install and manage.
- If you are using EasyServer, make sure to get the latest release, Version 1.6.2b6, from the company.

LAN Server

- Our LAN Server tests were beset with problems from installation to performance evaluation. IBM Corp. is working hard to correct these problems, but unless you are already using LAN Server, we caution against considering this product right now.
- LAN Server is the only product that allows you to dynamically update your extension maps and have the file icons change on the fly.
- LAN Server is the only product that supports extension mapping of more than three characters. With LAN Server you can map extensions of up to eight characters. For OS/2 HPFS users, this can really augment cross-platform file sharing with compatible applications.
- LAN Server and AppleShare are the only programs that implement two-way password encryption during log-on.
- IBM never tested the LAN Server for Macintosh product with more than five Mac clients before our evaluation. We could not connect all 44 of our Macintosh clients to the LAN Server.
- LAN Server is the only IBM PC or compatible-based network operating system that supports AppleTalk on only one network interface card, even though more may be installed in the server.
- LAN Server requires a corrective patch to the OS2LDR file to recognize more than 16 Mbytes of RAM. This patch is available on CompuServe.

NetWare

- To rebuild the desktop file on a Novell Inc. NetWare server you must connect using a Macintosh running System 6.0.7 and force a rebuild using the Command and Option keys when mounting the server volume.
- NetWare's Transaction Tracking option had no effect on server performance for Mac clients.
- Of all the products we tested, Macintosh users will find NetWare's user interface the most foreign to them.
- Only Macintosh users can be administered from a Mac because the current Mac utilities do not let you manage log-on scripts and security for PC users.

Vines

- Banyan Systems Inc. claims that you must wait five minutes after making AppleTalk configuration changes before the AFP services will reappear in the Chooser.
- Several Ethernet cards supported by Vines do not work well with the AppleTalk option. This list includes the Intel Corp. EtherExpress and Eagle Technology NE3200.
- Banyan is consistently the last vendor on the market to support new network interface cards.
- We could not perform our ACI US Inc. 4th Dimension tests on a Vines server. Banyan is aware of the problem but has no solution.
- Vines is the only PC-based network operating system that does not allow you to specify the zone in which AFP volumes will be published. The Vines server always appears in the default zone for a particular network.

— By Jonathan A. Oski

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Increased security makes file servers a safe haven for users

But the overlap between Mac and PC access privileges isn't always perfect.

By Jonathan A. Oski

One benefit of network computing is increased security — while it may not be apparent to most users, file servers often provide a safer place for their data than local workstations. Simply, file servers offer a tightly integrated security structure; workstations, as a rule, do not.

Security

In studying the security provided by six network operating systems, we focused on three areas:

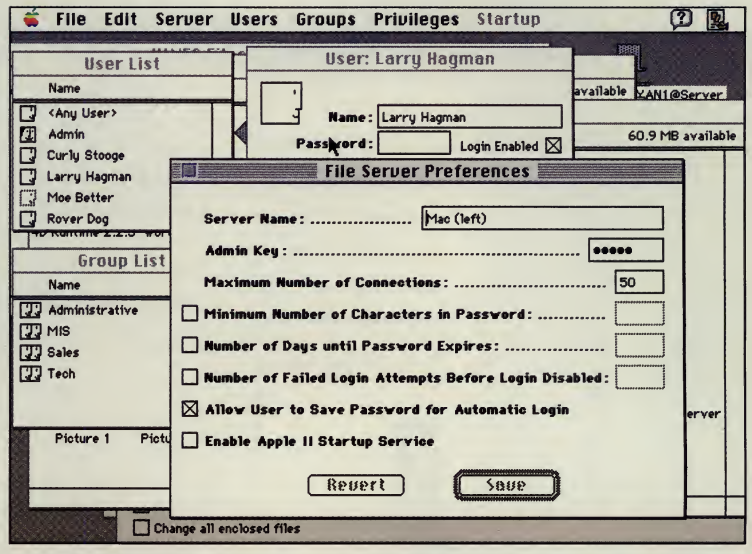
- Access security — how each NOS restricts access to the server.
- Data security — how each NOS handles access to volumes, folders and files.
- Logging features — how each NOS tracks security violations.

When you're constructing a security model for your network, consider who should have access to what, and what to do if someone tries to breach security.

Your security model may also have some platform-specific considerations. For example, should any user be able to log on from any type of workstation or just one type? If you choose to give access to all types of workstations, keep in mind that Macs, because of limitations with AFP (AppleTalk Filing Protocol), can use only eight-character passwords, while IBM PCs and compatibles generally allow 15. Allowing Macs on the network means everyone will have to conform to the Mac's limitations.

Unequal access. All of the NOSes we examined provide some access security. CoOperative Printing Solutions Inc.'s EasyServer offers the least restrictive model, while Novell Inc.'s NetWare and Banyan Systems Inc.'s Vines provide the most robust security systems. Guest log on, an AFP feature, lets non-registered users log onto the system and access only the volumes and files that have no specific permissions set. This feature is not generally available to PC clients unless they access the server using AFP. All the NOSes allow guest log-in, but we think it should be disabled in most cases.

Account expiration lets you create a log-on that is valid only for a limited time period. All of the products except EasyServer let you set expiration times of day for user accounts. More-robust security systems let you restrict the times that users can log on, the frequency with which they must change their passwords, and even restrict them from logging on from specific nodes. All of the primarily PC NOSes (Vines, NetWare, IBM Corp.'s LAN Server and Microsoft Corp.'s LAN Manager) let you restrict time-of-day access and specify password expiration dates.



Version 3 of AppleShare added a range of controls for password length, aging and control that were designed to make Apple's server as secure as non-Mac-based ones.

Some, such as Vines and NetWare, let you restrict users to particular workstations or LAN segments. The former, however, doesn't hold for Mac users, because of AppleTalk's dynamic addressing.

> Allowing Macs on the network means that everyone will have to conform to the Mac's limitations.

AppleShare 3.0.1 offers a unique NOS feature — the ability to disable the automatic log-on option of the AppleShare client. Normally, you can select an option in the AppleShare Chooser document that will automatically log you onto specific server volumes whenever you start your Mac. While this can eliminate a step for you, it can also lead to unchallenged access to a server.

Overall, the PC-based products let you impose more restrictions on non-Mac clients because they must execute vendor-specific applications to access the network. Since Mac access is granted — at least for file and print services — by using standard Apple system software, there's less control over these clients.

User accounts are notable in their relationship to the network's directory services. For most systems, separate user accounts must be created on each server a user will access. This can present a management challenge to the network administrator or user who must synchronize accounts, passwords and log-on restrictions across an enterprise of servers.

See Security, Page 44

If you want security, then why not a Unix server?

The network operating systems reviewed here exclude an entire class of servers: those that run as processes on top of Unix. (Exception: Banyan Systems Inc.'s Vines runs on top of Mach, but the presence of Unix under Vines is almost a technicality.)

AFP (AppleTalk Filing Protocol) add-ons for Unix have been around for a long time in the Macintosh market, and by their nature they are cross-platform. We plan to compare the leading Unix-based AFP servers in a future review.

In the meantime, here's an overview of the available software:

- **EtherShare.** The System V Release 4-based file server from Helios USA of Cupertino, Calif., also includes print spooling and AppleTalk routing in the package. EtherShare was upgraded last month to Version 2.2 (see MacWEEK, April 5). Prices vary depending on the host system but start at $4,990 for a 245-user license.
- **uShare.** Information Presentation Technologies Inc. of San Luis Obispo, Calif., sells this multipurpose server software that performs file sharing, print spooling and AppleTalk routing, along with a set of graphical administration tools and a Mac electronic-mail client for Unix mail. Running on Sun SPARCstations, uShare costs $1,395 for an unlimited-user license.
- **PacerShare.** Well-known in the VAX arena, Pacer Software Inc. of Westborough, Mass., has also brought its AFP and print-spooler services to Unix. PacerShare for Unix runs on top of System V and costs from $2,100 for 10 users to $6,000 for unlimited users.
- **Motorola Series 8000 Model 8120.** Motorola Inc. of San Jose, Calif., sells dedicated server hardware based on its 88100 RISC chip and PacerShare. Series 8000 servers start at $8,995 for a box with 16 Mbytes of RAM, a 330-Mbyte disk drive and a 150-Mbyte tape drive.
- **K-AShare.** Xinet Inc. of Berkeley, Calif. (formerly a division of Mt. Xinu Inc.), offers an AFP server that runs on several platforms: SunOS 4.x, HP-UX 8.x and IRIX 4.x. K-AShare 6.0 adds the niceties of AppleTalk routing, print spooling, AFP serving of Network File System volumes for which the server itself is a client, and automatic file-type mapping between compatible Unix and Mac documents. Prices range from $1,245 for 16 users to $4,495 for 128 users; the print spooler costs $895 per server.

Two of these companies, IPT and Helios USA, claim better-than-NetWare performance for their basic server systems, which raises the issue of Novell Inc.'s own NetWare for Unix. Formerly called Portable NetWare, this set of source code has been licensed to a wide variety of vendors that have implemented the file and print services on many platforms.

The current Version 3.11 does not support AppleTalk itself, but some vendors, such as Sun Microsystems Inc., have added it.

Lastly, one of the most popular AFP servers for Unix is the Columbia AppleTalk Package (CAP) from Columbia University in New York, a freely distributed, but copyrighted, set of source code that runs on more than a dozen Unix implementations. The current Version 6.0 (which in the fine Unix tradition includes patches from users all over the world) has limited support for AppleTalk Phase 2 and requires an IPTalk-compatible router to work with LocalTalk clients, but it does sport print-spooling capabilities.

Information on CAP is available on the Internet at gatekeeper.dec.com via anonymous FTP (File Transfer Protocol). — By Stephen Howard and Kevin Fox

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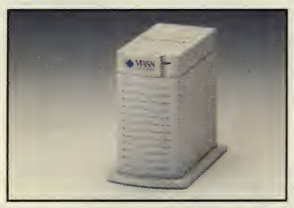

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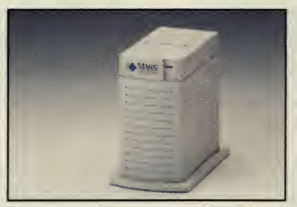

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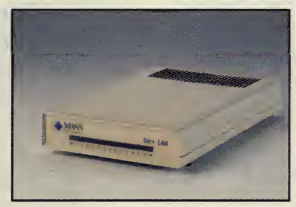

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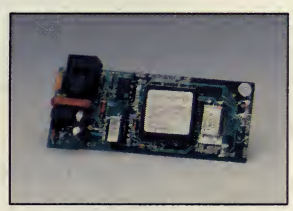

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Security

From Page 42

Banyan's StreetTalk and the Vines Security Service eliminate this requirement; each user account is maintained in only one location. This lets users access any server in an enterprise (to which they have rights) using a single account and password.

Dealing with snoopers. An added measure of security — password encryption — is offered in both Vines and NetWare. This prevents people from capturing user passwords with low-level tools like protocol analyzers and is a higher form of security than that offered by most NOSes.

The standard AppleShare Chooser document does not support password encryption; therefore, the remaining products that rely solely on Apple's software for accessing network services offer no enhanced password protection.

To enable NetWare password encryption, you must install the NetWare User Authentication Method (UAM) system extension on each Mac. Users must select Encrypted NetWare Authentication whenever they log onto a NetWare server. To enable this feature at the server, you specify the Encrypt option when loading the AFP module in the AUTOEXEC.NCF File. One side-effect of using this feature with NetWare is that start-up mounting of NetWare AFP volumes is not allowed.

> File security presents another challenge to the network administrator with a mix of PC and Mac clients.

Vines has always encrypted passwords for its PC clients, but for Mac users, encryption occurs only when the user logs onto Vines via StreetTalk, not when accessing AFP services.

Data security. File security presents another challenge to the network administrator with a mix of PC and Mac clients: The AFP security model allows you to specify access rights only at the folder level. Furthermore, there are only three designated levels of access: Owner, Group and Everyone.

Every PC-oriented NOS has a significantly more robust model for defining rights to files on network volumes. Problems arise when one method of assigning security overwrites another that doesn't necessarily have clearly corresponding settings.

For example, someone may change folder access from a Mac and the security settings for every folder nested below it in the hierarchy. This would certainly overwrite any file-specific setting within the tree and possibly lead to numerous problems.

Only two of the PC NOSes, Vines and NetWare, provide Mac client software that lets you specify the full range of rights supported by the product. With the NetWare DA, Network Control Center or Vines Utilities, Mac users can specify file-level access for any documents on the server.

There are also some Mac filing constructs that do not map well into some of the NOSes. Drop folders, or directories into which files can be placed but not seen, are not always interpreted the same by PC clients as they are by Mac clients. During our testing, NetWare was the only PC-based NOS that implemented the drop folder reliably from a cross-platform perspective. PCs that accessed EasyServer or AppleShare servers using Farallon Computing Inc.'s PhoneNET PC had no trouble with drop folders.

We either found discrepancies or were unable to implement cross-platform drop folders with Vines, LAN Manager and LAN Server. With LAN Manager, for example, we examined a Mac drop folder and found that its Write, Create, Delete and Attributes flags were set. But when we created a new directory on the PC with these same flags, it failed to appear as a drop folder to the Mac clients.

Logging features. One way to manage network security is to study NOS logs. If they are reviewed frequently, they are a good way to track unauthorized access attempts.

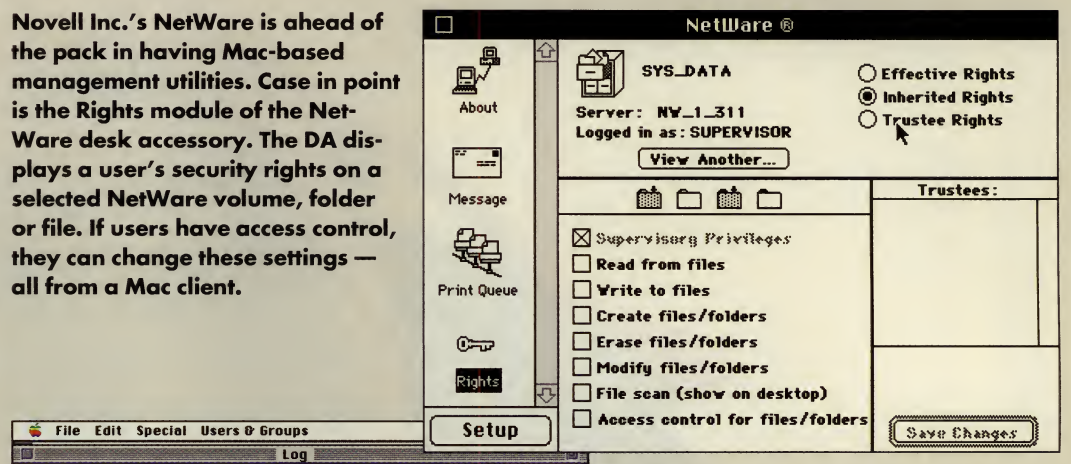
All of the products we tested create some sort of server log. The higher-end PC-based NOSes offered more verbose logging or the capability to select the degree of complexity. Using these logs, you can see every time a user logs onto the NOS and can track attempts to break in.

A problem with the logs is that they are often too cryptic for the average network administrator. AppleShare and EasyServer, however, create logs that can be easily read and deciphered. All error messages, log-ons and disk utilizations can be monitored.

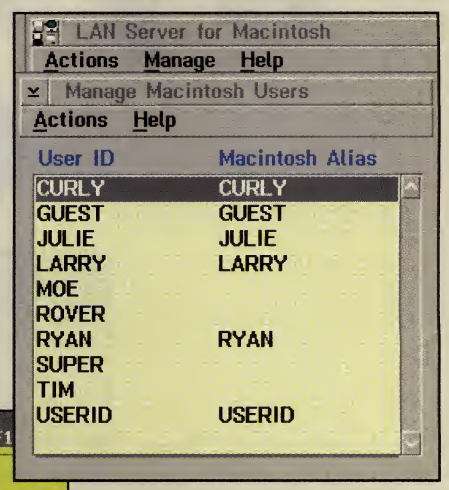
The other NOSes use separate logs to track their various services. Vines creates several logs, each focusing on a particular service, such as printers, security, file services or the operating system. In some cases, the logs have a report-like quality, while others look more like gibberish. □

The many faces of Mac security in industry-standard NOSes

Novell Inc.'s NetWare is ahead of the pack in having Mac-based management utilities. Case in point is the Rights module of the NetWare desk accessory. The DA displays a user's security rights on a selected NetWare volume, folder or file. If users have access control, they can change these settings — all from a Mac client.

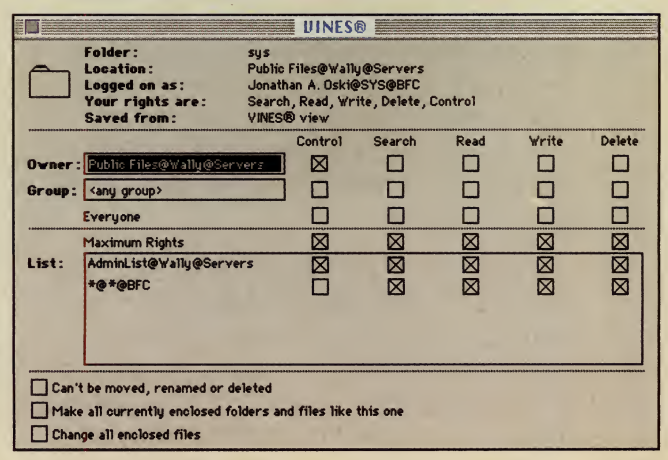


A file-server log is essential to good security. Even CoOperative Printing Solutions Inc.'s EasyServer, the simplest of the servers tested, maintains a log of activity. The server log stores the last 50 events that have been recorded. Since it tracks log-ons, such a record is useful for security, but EasyServer's log is aimed primarily at recording errors.



IBM Corp.'s LAN Server for Macintosh uses the user and group privileges defined under the OS/2 LAN Server. In addition, it allows for the unusual feature of account aliases, which permit users to log on via short easy-to-remember names rather than their full user names.

You might not recognize them, but the Volume Access Matrix shown here controls the AFP (AppleTalk Filing Protocol) access privileges for a folder or volume under Microsoft Corp.'s LAN Manager and its Services for Macintosh add-on.



Banyan Systems Inc.'s Vines has more security options than AFP supports directly, so the Vines client software offers two views of rights for any file, folder or volume. The Vines view (shown here) offers deletion and searching controls not available in the standard Mac view. In both cases, custom lists of users can be given specific rights, in addition to the rights defined for Owner, Group and Everyone.

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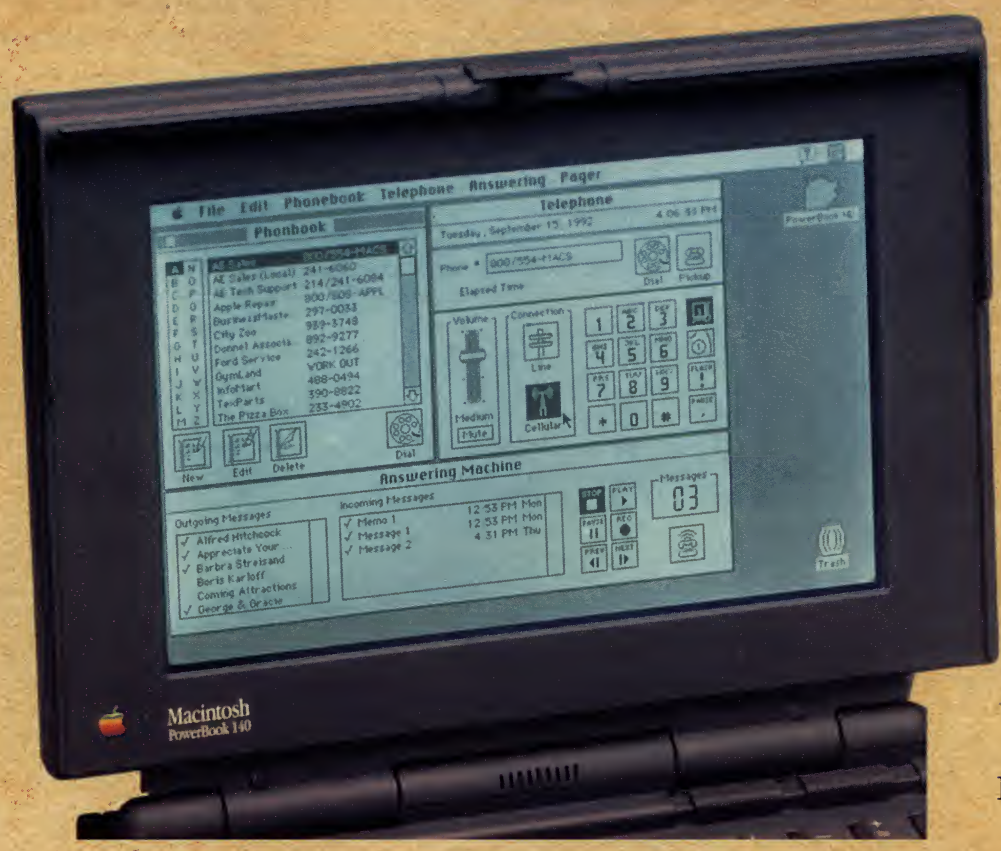

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Is it possible to lessen the task of installing a multiplatform NOS?

Only EasyServer and NetWare permit configuration from a Mac client.

By Jonathan A. Oski

Installation

A DOS- or OS/2-based network operating system probably is the most difficult software installation Mac managers will ever have to undertake. On the other hand, compared with an electronic-mail package or other large groupware installation, setting up AppleShare or CoOperative Printing Solutions Inc.'s EasyServer is a piece of cake.

Of course, simple installation doesn't necessarily translate into broken records in performance or manageability. If large or mixed networks are your game, it may be time to roll up your sleeves and get your hands dirty under the hood of an Intel-standard box.

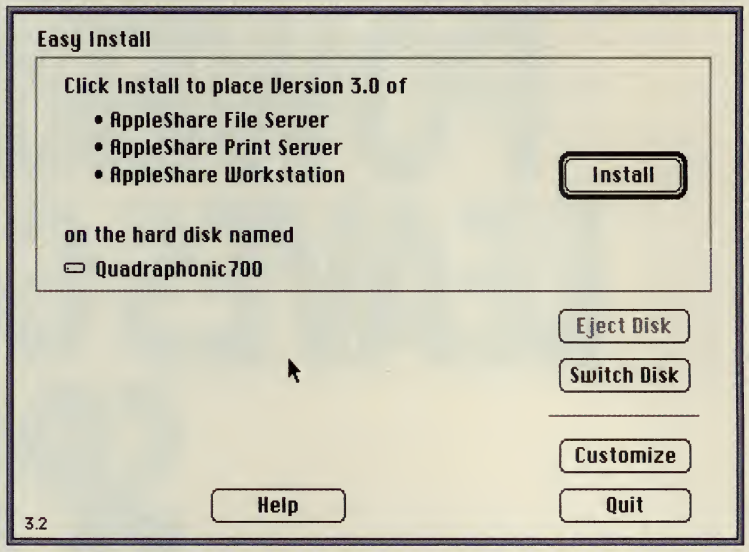
Of the six AppleTalk-compatible NOSes we evaluated, each has its own peculiarities and deficiencies in the installation process. In general, the more purely "PC" the system, the tougher the installation. AppleShare and EasyServer were by far the easiest to get up and running, while Apple's archrival and sometimes-bedfellow, IBM Corp., offers a harrowing installation with its combination OS/2 2.0-and-LAN Server package.

We found that it pays to keep copious notes about your original hardware configuration as you enter the lair of the dragon — you'll need them when you install and configure your NOS.

Easier than Apple's pie. For our tests of EasyServer, we used a preconfigured Python directly from COPS, so the installation process was practically nonexistent. You put an unprotected Server Startup disk in the floppy drive and attach any Mac-formatted hard disk to the SCSI port. Turn it on, and EasyServer is ready for your user accounts and security configuration.

Mac-likeness. Installing AppleShare 3.0.1 was second in simplicity only to EasyServer. Before you can install AppleShare, you must load System 7 on a formatted server disk — a process simplified by using Apple's Installer utility. If you're installing support for Mac and IBM PC or compatible clients, there are three AppleShare disks to install. Once installation is complete, you restart and are ready to begin configuring.

After installing either AppleShare or EasyServer, all that's left to do is create user accounts and assign permissions. Both of these products have built-in AppleTalk, so no additional protocol support needs to be added.



AppleShare installs in a manner that should be very familiar to any Mac manager. Other network operating systems aren't nearly so easy.

For the remaining products, however, installation is just the first step; AppleTalk support must be installed and configured before clients can access the server.

Climbing the Vines. So much for the easy ones. Both Novell Inc.'s NetWare and Banyan Systems Inc.'s Vines are more difficult to install, although Vines is probably the easier of the two.

To install Vines, you start up the server from a pair of Vines installation disks. A shell is loaded, providing menus of options relating to the preparation, installation or upgrading of a Vines server. If you're installing a server for the first time, you must first undertake the time-consuming task of disk preparation, in which the disk is examined for any defects and formatted for Vines. The amount of time this takes is directly proportional to the size of the disk: You can expect anywhere from 90 minutes to four hours.

You install the operating system from floppy or tape. Floppy disk installation requires shuffling 24 disks into the drive. If you have a SCSI DC-600 tape drive, you can install from a supplied tape and eliminate tedious disk swapping.

After installation, Vines prompts for information about network adapters (and any other pertinent cards) installed in the server. Device drivers are then constructed, and the system restarts and requests a server name. If you're installing a single Vines server that's not networked with any others, you must also supply a Street-

See Install, Page 48

Installing server hardware: Three levels of difficulty

We used several hardware platforms to conduct our tests at Ziff-Davis Labs (see story, Page 34). AppleShare 3.0.1, which runs only on System 7, requires a Mac as a server. CoOperative Printing Solutions Inc.'s EasyServer software can be run on virtually any 286-, 386- or 486-based IBM PC or compatible, or you can buy a preconfigured server from COPS. Likewise, Novell Inc.'s NetWare, IBM Corp.'s LAN Server, Banyan Systems Inc.'s Vines and Microsoft Corp.'s LAN Manager can run on many middle- to high-end PCs.

Your purchases should account for the scalability of the hardware. Performance of virtually any server can be augmented by the addition of memory, network interface cards, application processors, CPUs and disk subsystems. Consider your immediate requirements as well as projections for a year or two down the road. We chose a Macintosh Quadra 950 and Compaq Computer Corp. Systempro/XL for our servers because we believe they are typical high-performance server platforms. The EasyServer Python we used is a preconfigured, self-contained unit and, therefore, offers only limited scalability.

Our server installations could be classified in three levels of difficulty. Far and away, the easiest product to install was the aptly named EasyServer. Preconfigured EasyServers simply require no server preparation.

The EasyServer does not support more than one LAN adapter, a significant mark against it. In most cases, network managers will seek the optimal configuration from a performance standpoint. One way to reduce access contention and network traffic on a LAN is to break the network into segments by installing additional network adapters. This is a primary difference between the configurations used for testing. We saw no need to handicap the majority of the products because of a shortcoming in one of them.

Preparing AppleShare on the Mac is also easy. Some Centris Macs and all Quadras are equipped with Ethernet, so you may need to install only additional memory or disks. For our tests, we assumed that more than one LAN segment would be necessary to achieve maximum performance from our servers. In this case we also had to install additional network interface cards. Since AppleShare does not by itself provide multisegment routing, we also tested a server running Apple Internet Router 3.0 to allow the server to be accessed from clients on four separate segments.

Preparing a PC-based server is usually a more involved process than preparing a Mac. Although PC manufacturers have done a lot to simplify the hardware configuration process, it can be daunting for the inexperienced. While the days of configuring PC adapters with jumpers and DIP switches are finally beginning to fade, there is still quite a bit to understand when it comes to configuring the cards you install in a PC. To make matters worse, the PC bus standard has diversified. The Industry Standard Architecture (ISA) has been joined by the Micro Channel Architecture (MCA) and Extended Industry Standard Architecture (EISA). In most cases, adapters designed for the different bus types are not interchangeable.

Configuring these adapters involves mapping out settings for all the cards that will be installed. The mapping is necessary to avoid any conflicts between the interrupt channel, direct memory access channel, I/O address, and RAM and ROM settings that an adapter may use.

In our case, Compaq provides EISA Configuration software that helps you avoid conflicts between cards. Generally, you must run such a utility whenever you make changes to the hardware configuration of a PC. The same applies to PCs based on MCA, and less so to ISA machines.

ILLUSTRATIONS BY JEFF QUAN

In addition to configuring the network adapters, we also needed to use the EISA Configuration utility to indicate which operating system we planned to install, the amount of memory to use and how it will be allocated, and the settings for the other ports available in the computer. There is no installation anywhere near as complex on the Mac. For those unfamiliar with PC hardware, this is sure to be an eye-opener.
— By Jonathan A. Oski

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Install

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Talk name for the person who will initially be designated as the server administrator (StreetTalk is Vines' networkwide directory-services component). If you're integrating a new server on a network with other Vines servers, you must log on during the installation process as someone with installation privileges.

To bring the system on-line, Banyan requires you to have a license key attached to the server's parallel port. The company sells AppleTalk and other options for Vines as extra-cost add-ons, and these use additional hardware dongles that temporarily attach to the main key during installation. After attaching the AppleTalk key to the back of your server and installing the software, you'll finally be able to configure the system.

This is a menu-driven process in which you identify each card that will support the AppleTalk protocol, indicate whether it is a "seed" or "nonseed" port for routing purposes, and assign a network range and the zone for that network segment. There is a bug in the current release that requires you to rebuild the server's device drivers and restart the server before AppleTalk can be started. Servers will advertise their AFP (AppleTalk Filing Protocol) services only in the default zone for any particular LAN segment. You can work your way around this limitation if you have more than one LAN card in your server, but this is awkward. Ideally, you should be able to specify the zone in which the server will appear to your clients.

Dipping your NetWares. NetWare installation is somewhat similar to Vines'. Before installing NetWare you need to use the DOS Fixed Disk Utility (FDISK) to create a partition of 3 Mbytes to 4 Mbytes on the server's start-up disk. Once the DOS partition is created and formatted, files are copied from the NetWare installation disks to this partition.

The SERVER.EXE program loads the NetWare operating system, and the Install module completes the installation by creating the SYS volume, installing the remaining System and Public files, and editing the AUTOEXEC.NCF file so that the proper network drivers are loaded and bound to the network adapters you have installed. This critical configuration file must be "hand-edited" using the NetWare editor. Mac users are apt to find this step fiendishly unfriendly since even the slightest typo can cause your server to start up improperly.

NetWare's AppleTalk configuration is more flexible than Vines' in that you can specify the zone in which the server will appear for any network. Unfortunately, this part of the configuration process is entirely manual and requires that you edit the AUTOEXEC.NCF file to specify the AppleTalk settings for each adapter installed. This is a task that you'll have to perform infrequently, but it will be awkward even for most seasoned Mac administrators.

Two OS/2s. IBM's LAN Server 3.0 and Microsoft Corp.'s LAN Manager 2.2 share similar installation requirements because they are both based on OS/2. When installing NetWare or Vines, you're essentially installing the base operating system along with the NOS. For both LAN Server and LAN Manager, however, the base operating systems, OS/2 2.0 and 1.3, respectively, must be installed in advance. This is akin to AppleShare's requirement that System 7 be preinstalled; however, installing OS/2 is a more difficult task.

Installing AppleTalk for both LAN Manager and LAN Server is similar. Like NetWare, a configuration file — PROTOCOL.INI — and PC configuration file — CONFIG.SYS — must be edited to specify the network interface cards being used and their AppleTalk settings — an unfriendly proposition.

LAN Man. LAN Manager requires Version 1.3 of OS/2 — the last version of that operating system for which Microsoft claims credit. To its detriment, OS/2 1.3 is limited to accessing 16 Mbytes of RAM, unlike the other NOSes we tested. We installed 32 Mbytes of RAM in the other Compaq servers used for testing because we believed this was a likely configuration for a high-profile LAN, particularly given the low price of RAM and our goal of supporting 100 clients on one server.

Installing OS/2 1.3 is straightforward: An Install disk prompts for a few pieces of information and is followed by seven more disks. Then you move on to LAN Manager.

During the installation, you are prompted to answer questions regarding installed network adapters, protocols requested, the name of the server and the server type (Primary Domain, Backup Domain or Member).

OS/Blue. Installing LAN Server 3.0 Advanced requires IBM's OS/2 2.0, and its installation is noticeably more complex than that of Version 1.3.

Unlike its predecessor, OS/2 2.0 gives you access to an impressive 4 Gbytes of RAM and up

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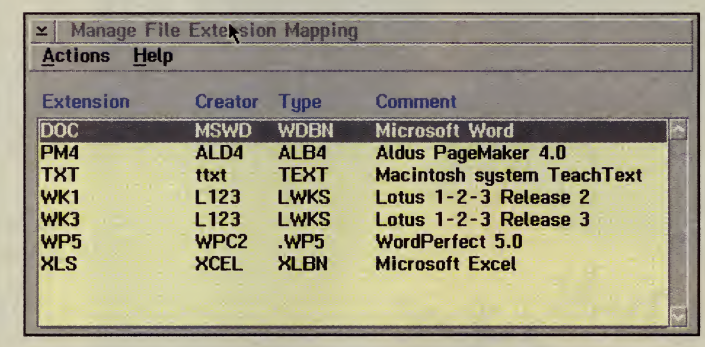
The first step's a doozy: Installing network operating systems

In Banyan Systems Inc.'s Vines, as in other cross-platform network operating systems, you have to configure each network interface card for AppleTalk before Macintoshes can log onto the server. (This is after you've formatted the hard disks and installed the underlying operating system.) Vines' management software is harshly character-based, but it works smoothly without much trial and error.

```
                                                    Manage AppleTalk
                                                    Manage Ports
Use arrow keys to select a command and press <RETURN>

    ADD a port                          DELETE port
    MODIFY a port                       ENABLE/DISABLE port
    MANAGE zones

Server: Wally                                AppleTalk Phase 2   RUNNING

Port  St Description       Network Range     Default Zone

4     E  Wally TokenTalk4 301-310          Systems
3     E  Wally EtherTalk3 10-20            VINES Servers
5     E  Wally TokenTalk5 311-320          Systems


ESC to exit; F9 for zone details; F1 for HELP
```



Like Vines and Microsoft Corp.'s LAN Manager, IBM Corp.'s LAN Server allows you to map file name extensions on an IBM PC or compatible server to the invisible file types used by Macintosh documents. IBM automatically installs only a limited number of predefined mappings in LAN Server for Macintosh, but the documentation contains a fairly exhaustive list that you can add manually. A bonus: The configuration environment is OS/2 2.0's friendly Workplace Shell.

Here's the worst of it: the intricate and opaque CONFIG.SYS file, which underlies several of the NOSes we tested. This example file from Microsoft's OS/2-based LAN Manager specifies the network drivers and other specifications that will apply when the server is started up. When configuration changes need to be made, the CONFIG.SYS file must be altered by hand in an unhelpful text editor.

```
IFS=C:\OS2\HPFS.IFS /CACHE:64 /AUTOCHECK:D
run=c:\os2\cache.exe /lazy:off
PROTSHELL=C:\OS2\PMSHELL.EXE C:\OS2\OS2.INI C:\OS2\
SET COMSPEC=C:\OS2\CMD.EXE
LIBPATH=C:\OS2\DLL;c:\vines\dll;C:\OS2\SUPPORT;C:\;
SET PATH=c:\sql\binp;C:\OS2;C:\OS2\SYSTEM;C:\OS2\IN
SET DPATH=C:\OS2;C:\OS2\SYSTEM;C:\OS2\INSTALL;C:\;
SET PROMPT=$i[$p]
SET HELP=C:\OS2\HELP
BUFFERS=30
IOPL=YES
MAXWAIT=3
memman=swap,move,swapdos
PROTECTONLY=YES
SWAPPATH=C:\OS2\SYSTEM 512
THREADS=128
SHELL=C:\OS2\COMMAND.COM /P
BREAK=OFF
FCBS=16,8
RMSIZE=640
rem DEVICE=C:\OS2\EGA.SYS
rem DEVICE=C:\OS2\DOS.SYS
```

```
File Server name NW_1_311
IPX internal net 10000001

Load NMAGENT
Load STREAMS
Load CLIB

Load NE2000 frame=ETHERNET_802.2 name=NE200
Load NE2000 frame=ETHERNET_802.3 name=NE200
Load NE2000 frame=ETHERNET_SNAP  name=NE200
Load NE2000 frame=ETHERNET_II    name=NE200
Load APPLETLK                    net=    10
Bind IPX      to NE2000_1E_802.2 net=100010
Bind IPX      to NE2000_1E_802.3 net=100010
Bind IPX      to NE2000_1E_SNAP  net=100010
Bind IPX      to NE2000_1E_II    net=100010
Bind APPLETLK to NE2000_1E_SNAP  net=100-20

Load AFP
Load ATCON
```

The AUTOEXEC.NCF file controls the initial start-up process for Novell Inc.'s NetWare. Its cryptic commands also must be edited by hand, and a simple typo can prevent a server from starting up. Mac managers attracted by NetWare's performance will find this element of installation unnecessarily unfriendly.

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Install

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to 1,536 Gbytes of disk space.

Installing OS/2 2.0 is not straightforward, however. After installing the base software, you must install the Corrective Services patch that fixes some problems with the initial release of Version 2.0. This patch occupies a whopping 12 disks, giving the impression that the whole operating system is being replaced. Next, you install LAN Adapter Protocol Support, which lets you configure the network interface cards and load different LAN protocols. IBM recommends that you install OS/2 Extended Services next. This is not required for standard file- and print-service functionality, but it does add the IBM OS/2 Database Manager and Communication Manager.

Finally, LAN Server can be installed following either the Basic or Advanced procedures. We chose the Advanced method because it provides greater control over the installation process; IBM also recommends this method if you're planning to run a medium-to-large-size network.

The LAN Server installation is very unforgiving. If you make mistakes when selecting items during installation (such as choosing the wrong network interface card), you may have to restart the process because the system will halt when started up. The only way to fix this problem is with a High Performance File System start-up disk made on another OS/2 workstation. If you don't have another workstation, you'll have to restart your installation from scratch.

Getting to work. The final steps of installing a NOS include creating user accounts and passwords, setting up file and print services and, in some cases, defining PC-to-Mac extension mapping.

Creating user accounts is not really a chore using any of these systems, although some are simpler than others.

One easy setup. EasyServer allows administration from any networked Mac. Using the EasyServer Admin program, you create users and groups similar to those in System 7's file sharing. Users can be assigned to as many groups as you wish. The number of user accounts is limited only by memory and disk space. With the current release, only a limited number of users — close to 100 — can be simultaneously connected to the server.

EasyServer does not provide any print spooling, so once you have defined your users and groups, the server configuration is complete and ready for use. Although EasyServer's functionality is limited to file services, to its credit, it is very easy to install and configure.

Setting up AppleShare. AppleShare configuration is somewhat more involved, as print spooling is also supported. The configuration process for users and groups is almost identical to that for EasyServer, with the exception that all administration must be performed at the server. Configuring the Print Server is also straightforward. Each AppleShare server can serve up to five printers, and given sufficient disk space, the print queue can hold up to 1,000 jobs.

Names and faces. Neither EasyServer nor AppleShare supports directory services, also called network naming services. This is a significant difference between these two products and the remaining four. These services require some careful planning to avoid a time-consuming process of re-entering a new naming structure down the road.

Banyan's StreetTalk is the state-of-the-art directory service.

Under Vines, every network entity — including users, lists, printers, file services and modem pools — has a name. StreetTalk uses a three-part name — item, group and organization — into which most organizations can be easily mapped.

For instance, a name can be an item in a department within a division or company. Vines 5.5 added a new dimension to StreetTalk: A virtually unlimited number of attributes can be defined for any name in the StreetTalk directory. These attributes can include addresses and phone numbers for individuals in the organization. With some imagination, this flexibility can be put to a variety of uses.

Organizations, groups and users are established using Banyan's menu-driven Manage utility, and file and print services are created in a similar manner. StreetTalk names can be up to 31 characters, but passwords are limited to eight characters if your users will be logging on from Mac clients. (This is the result of a limitation in the Chooser and AFP and applies to every NOS we tested.)

Macintosh users can mount volumes from any Vines server that has AppleTalk running, assuming they have permission for that service (see story below).

With Vines, printers can be attached to the server or to individual workstations.

Networked printers that support Apple's Printer Access Protocol (PAP) are also supported. In fact, Mac users can print only to Vines print services that spool to PAP printers. This limitation is shared by most of the NOSes we tested. Vines administration must be performed almost entirely from DOS or OS/2 workstations.

Net results. NetWare 3.11 does not offer the extensive directory capabilities of Vines, but the concept of users and groups exists and should be configured with the organization in mind. One of NetWare 4.0's biggest features is the inclusion of X.500-based directories, which are distributed throughout the network (see story, Page 35).

NetWare is unique among the PC-oriented NOSes in that a wide variety of network-administration tasks can be performed from the Mac. You can also create users and groups from DOS workstations using the Syscon utility. Again, server configuration primarily involves creating user accounts and defining file and print services.

NetWare's ability to extend network administration to Mac clients is a big advantage. With additional products, such as Insignia Solutions Inc.'s SoftPC and SoftNode, you can perform virtually all NetWare administration tasks from a Mac workstation.

OS/2's domain. Both LAN Manager and LAN Server have similar network-directory structures — although useful to only non-Macs — referred to as "domain-based" naming. This method is not as robust as StreetTalk, but it offers some directory-related features not found in NetWare. Servers can be grouped together into domains where one machine functions as the primary server. User rights can be assigned for the whole domain and, therefore, need not be granted on a server-by-server basis. Since AFP does not support domain features, however, this functionality is limited to DOS and OS/2 workstations; Mac clients must be defined on each server.

In LAN Manager, accounts are managed using the Net Admin utility. This can run on the server or a DOS or OS/2 client. When setting up Mac users, you must adhere to the same limitations imposed by AFP — such as eight-character passwords — but aside from this, it's a direct process. Mac print queues are established by modifying the PROTOCOL.INI file with a text editor. The print queue can be managed with Net Admin and accessed by both Mac and PC clients.

LAN Server accounts are handled using the Requester utility. Mac users can be managed separately using the Mac Requester. This is a clear process that can be performed at the server or from an OS/2 client. LAN Server has the

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NOSes help to watch your back

In addition to file and print serving, a network operating system may provide a variety of electronic-mail, security (see story, Page 42), group scheduling and conferencing services. Of the many additional services offered, we think backup deserves immediate attention.

AppleShare, CoOperative Printing Solutions Inc.'s EasyServer and IBM Corp.'s LAN Server do not offer any backup services as part of the base product. This is a serious deficiency that you should plan to address as part of installing these products. Third-party offerings, such as Retrospect from Dantz Development Corp., will provide effective solutions.

Banyan System Inc.'s Vines includes full support for scheduled, unattended backups as a feature of the operating system. This utility can schedule full or incremental backups to a variety of media, including DC-600, 4-millimeter digital audio tape and 8-millimeter Exabyte tape.

Like Banyan, Novell Inc. includes an integrated backup utility with its NOS. Using the Sbackup or Nbackup utilities provided with NetWare, a server can be backed up from a networked client or locally.

Microsoft Corp.'s LAN Manager, meanwhile, bundles Sytron Corp.'s Sytos Plus for OS/2, generally considered one of the better backup applications for IBM PCs and compatibles. — By Jonathan A. Oski

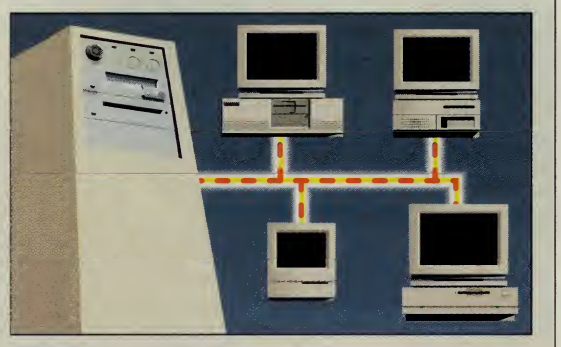
Configuring clients

With the exceptions of Banyan Systems Inc.'s Vines and Novell Inc.'s NetWare, no client installation is necessary for Mac workstations accessing the servers we tested. All network services are available to Macs using the Chooser's printer or AppleShare icons.

Vines clients can manage file security from their workstation using the Vines Utilities for the Mac. Vines is a bit strange, however, in that there are two separate log-ons required to gain full Mac functionality. For file-service access, you must follow the usual Mac conventions for logging onto a server. To use Vines utilities or Vines' electronic mail, you will need to log on separately through the Vines icon in the Chooser.

NetWare offers quite a bit of functionality to Mac clients, such as network administration and management of network print queues. The user interface for these NetWare utilities is awkward, however, and will take some getting used to. Nevertheless, Novell should be applauded for coming closest to treating the Mac as an equal client on the network. Furthermore, NetWare requires only one log-on per server to access all file services or to perform network management.

DOS, Microsoft Windows and OS/2 installations are required for all IBM PC and compatible-based clients that need to access these network operating systems. To access CoOperative Printing Solutions Inc.'s EasyServer or an AppleShare server from a PC, you need to load the AppleTalk protocol stack. To achieve this for our tests, we used Farallon Computing Inc.'s PhoneNET PC 3.0. Installation of PhoneNET is vaguely similar to client configuration for NetWare, Microsoft Corp.'s LAN Manager or IBM Corp.'s LAN Server in that you have to edit configuration files that specify the network adapter used in the workstation.



Vines has a utility, PC-COPY, that allows you to create start-up disks for any support network adapter. This simplifies the process for natively supported drivers. — By Jonathan A. Oski

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Install

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dubious distinction that all administration must be performed from an OS/2 platform. IBM said you can use an application programming interface to write management applications for DOS, but that generally is a prohibitive undertaking.

Conclusions. The installation process for these six NOSes can take anywhere from 30 minutes to a full day, depending on the amount of hardware preparation needed, the complexity of the user accounts and network services you wish to create, and the number of problems you run into along the way. Generally, the documentation that accompanies these products is only fair. EasyServer's docs are badly out-of-date. NetWare's and Vines' are quite voluminous and take some time to wade through. IBM's LAN Server documentation was nearing finalization, and the copy we were sent appeared thorough but was not sufficient for troubleshooting all of the problems we encountered. Microsoft's LAN Manager documentation adequately covered the installation process and was easy to read. Apple's documentation is quite readable and fairly thorough. Like most Apple documentation, it errs on the side of verbosity, but this is hardly worth complaining about.

Installation is a necessary evil, but generally, we feel that the payoff — in terms of increased performance, manageability and services — offered by products such as NetWare and Vines outweighs the burden of installation.

If you're planning a large-scale deployment of one of these systems, you'll be best served by employing in-house expertise, but initial installations can be easily handled with the cooperative effort of a hired gun. □

Product Info

APPLE
AppleShare Server 3.0.1: $1,199; **Apple Internet Router 3.0:** $499 (Basic Connectivity Package); wide-area routing extensions available
20525 Mariani Ave., Cupertino, Calif. 95014
Phone (408) 996-1010 or (800) 776-2333

BANYAN SYSTEMS INC.
Vines 5.5: $1,495 (five users), $2,895 (10 users), $4,595 (20 users), $8,495 (unlimited users)
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COOPERATIVE PRINTING SOLUTIONS INC.
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IBM CORP.
LAN Server 3.0 Advanced: $2,295 (single-user version)
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LAN Manager for OS/2 2.2: $65 per client (license pack); **LAN Manager Services for Macintosh 1.0a:** $995
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NetWare 4.0: $1,395 (five users), $47,995 (1,000 users); **NetWare 3.11:** $1,095 (five users), $4,995 (50 users), $6,995 (100 users), $12,495 (250 users); **NetWare for Macintosh 3.011:** $495 (five users), $895 (20 users), $1,995 (100 users), $2,995 (200 users)
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We've always said that the Mac is a great workstation but a lousy server platform — now, Apple finally agrees. While Unix-based servers have their place, there are better ways.

COPS EasyServer AFP server

EasyServer™ is a better way. According to a *MacWeek* review (7/13/92), EasyServer is 1,000% faster than a typical Mac AppleShare server. With complete remote administration, EasyServer is easier to control. Removable Mac media (CD, Syquest, etc.) can be mounted and un-mounted on the fly. Hosted on a low-cost Intel 386/486 platform, EasyServer can use any Mac-formatted SCSI disk — *as is*, with absolutely no changes. *MacWeek* summarized it all by saying "... from a price/performance perspective it is hard to beat the EasyServer".

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Building complex databases with management systems

The time is right for using objects in custom database applications.

By R. Bradley Andrews

From programmers to those who supervise them, people at all levels of custom software development are being affected by object-oriented programming technology. This is especially true in creating custom database applications.

Unlike traditional programming languages, object-oriented programming (OOP) applications can hold both the data and the program code needed to represent the different parts of the system.

According to programmers, this has proven to be a much more effective way to handle the data-handling tasks found in today's database applications.

OOP tools, such as MacApp from Apple or Think C from Symantec Corp., simplify the development of programs that can fully exploit the features available in the Mac interface.

Object database management systems (ODBMSes) offer a way to incorporate OOP technology into custom database applications by storing a piece of data and its interrelationships in the same place, which greatly simplifies the task of creating custom database applications.

While both MacApp and Think C have helped keep the Mac in the forefront of the OOP technology, the Mac has lagged behind in tools to store data in object-oriented structures.

However, a few forward-looking companies have seized this opening with their own object database offerings on the Mac. Two code libraries (Neo•logic Systems' NeoAccess and Poet Software's Poet) and one stand-alone product (Mainstay's Phyla) now offer object database functionality.

At the low end of functionality, ODBMSes provide object persistence, that is, the ability to retain objects and their interrelationships between different program sessions, while more advanced features include security control, concurrence control (controlling simultaneous access to the same data by different users) and complex data-manipulation functions.

Regular database tool problems. Within custom applications that include relational database or simple flat-file functions, data is stored either by forcing each new version to have its own read and write routines, or by using third-party code libraries or external database systems, such as Inside Out II from Sierra Software Innovations Inc. or Oracle for the Mac from Oracle Corp.

Because the relational database uses a single-data model — tables of rows and columns and a query language based on a few simple operations on these tables — relational databases are popular on microcomputer systems.

Other more complex features, such as integrity constraints and view definitions that hide or manipulate data, are typically hidden from the user.

Beware of the BLOB. Unfortunately, the same simplicity that makes relational databases easy to use also makes it difficult to handle the more-complex data types that are becoming widespread in such application areas as multimedia. These data structures are often called binary large objects (BLOBs) because they are treated as large blocks of binary data.

Almost any object can be shoehorned into the table format used by relational databases, but this is usually an inefficient method of storing BLOBs.

An object database, on the other hand, provides ways to both store and retrieve objects without having to concern itself with the exact formats of the data or their relationships.

The ODBMS advantage. While the relational model can be extended to handle BLOBs, ODBMSes can be integrated into custom applications much more smoothly. BLOBs are much easier to store and retrieve when the save and restore functionality is built into an existing ODBMS code library than when they have to be reconstructed for each individual object.

For example, if a database needs to store references to various video, audio and textual elements that make up a multimedia presentation, an ODBMS would be able to save all the components by simply sending a "Save Yourself" message to the objects. The various classes of objects would handle all the specifics of actually storing the data and relationships to disk.

With an ODBMS, data in the database can be stored in functional groupings that reflect real-world relationships, instead of having to be restructured into the model of rows and tables.

Because of this, an ODBMS organizes the data in such a way that it can easily handle the complex interrelationships.

Even a less complex database, such as an employee database, can benefit from the object approach. Because different aspects about each employee need not split into separate tables, they can be kept in the main employee file.

In addition to being conceptually easier to understand, such a structure limits the number of joins required when retrieving employee data. Joins are one of the slowest operations in relational databases because they require reassembling the data that was broken up to fit the strict relational model.

What's available. Both NeoAccess and Poet are code libraries that provide basic-level ODBMS capabilities, including object persistence and other basic data storage and retrieval operations for custom Mac programs.

Phyla, a database system from Mainstay, will be the first stand-alone entrant into the ODBMS arena when it is released this summer. The company claims users will be able to produce object databases by simply drawing the appropriate structure and layouts that properly define the database.

NeoAccess is a growing library of routines that provide full access to the basics of the object model. The flagship product of Neo•logic, NeoAccess is a library that is compatible with both MacApp 3.0 and Think C. A version is also available that works under Microsoft Windows.

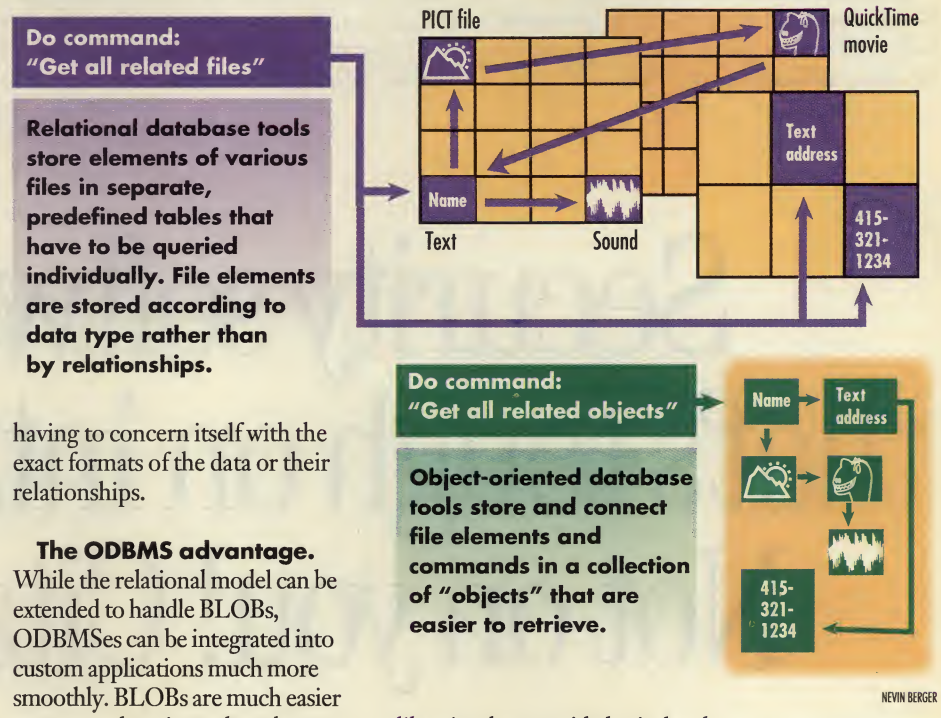
Like NeoAccess, Poet is also a library of routines that are designed to be integrated into your in-house programs. Version 2.0 has just been released and provides support for an even wider range of platforms, including Macintosh, DOS, Windows, OS/2 and Unix. Poet pricing starts at $2,700 for a one-to-four-user development environment.

Although priced higher than the $499 NeoAccess, Poet adds several functions geared toward client-server development, including multi-user capability and record locking, which are currently missing from its competitor. Neo•logic is planning on its own multi-user capability in the near future.

Mainstay's Phyla is targeted at a different market than the code

See ODBMS, next page

Relational vs. object-oriented databases



NEVIN BERGER

Just what is an object?

An object is similar to a subroutine in a program, only an object can contain many subroutines and is infinitely more movable within the structure of the program.

A window object, for example, will have many possible substructures associated with it: connections to buttons, check boxes, scroll bars and the many picture elements that are displayed in its area. Each object can also include special information to allow it to determine the exact action to perform when it is used.

In addition to storing these relationships, an object can also save the current values of each item, such as whether a check box is selected, between program sessions. — By R. Bradley Andrews

ODBMS

From previous page

libraries and, instead, aims to provide a visual development environment that gives nonprogrammers access to the power of the ODBMS model.

First impressions. Although both NeoAccess and Poet have been on the market for several months, none of the programmers we contacted has yet to complete a full application using them. Most are excited about the possibilities afforded by ODBMSes on the Mac, however, and plan to integrate them into production shortly.

"We were quite impressed that NeoAccess could handle large amounts of data and provide key access almost immediately," said Fotios Skovzes, information systems director of Landover, Md.-based Falcon Microsystems Inc., a Mac value-added reseller that works with the federal government.

Jeff Hokit, a software engineer at Apple, said he also liked the way NeoAccess provided instant storage capability and automatically saved and restored objects with a single command.

Robert Gordon, an independent software developer in Houston, was drawn to the single-user version of Poet and plans to use it in a future project. "It provides the object persistence I need at a price that is very affordable," Gordon said.

Code storage. Although a full-fledged ODBMS would store the database elements code as well as its data and relationship information, neither Poet nor NeoAccess can do so yet. While this may be a limitation to some potential users, the ability to store the data portion of the object is a powerful capability.

However, experts said that code storage will still become important as the technology matures.

Not for all applications. Although the ODBMS tools can be a great asset in many kinds of applications, they are not necessary in all cases and can even be detrimental with very simple data structures.

Also, relational systems are not standing still, and some already incorporate the better features of object systems, such as support for BLOBs and storage of procedures tied to data elements.

Time-critical applications such as transaction processing will probably continue using the relational model for some time, but others, such as office personnel systems and online libraries, will likely end up with something that is a hybrid of the two, employing the most appropriate element of each model for specific parts of the overall system. □

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MacApp 3.0: $350 (CD-ROM version), $395 (disk version)
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NEO•LOGIC SYSTEMS
NeoAccess: $499
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Phone (415) 566-9207

ORACLE CORP.
Oracle for the Mac: $695
500 Oracle Parkway, Redwood Shores, Calif. 94065
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POET SOFTWARE
Poet 2.0: $599 (single-user version), $2,700 and up (one-to-four-user version)
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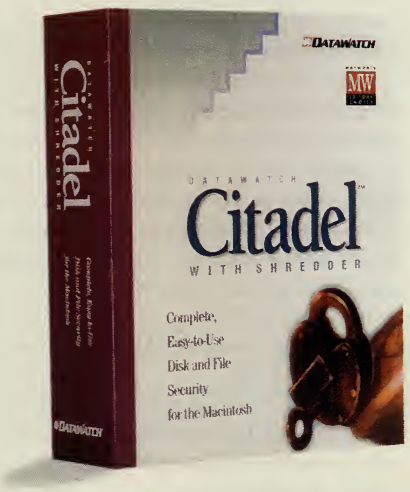

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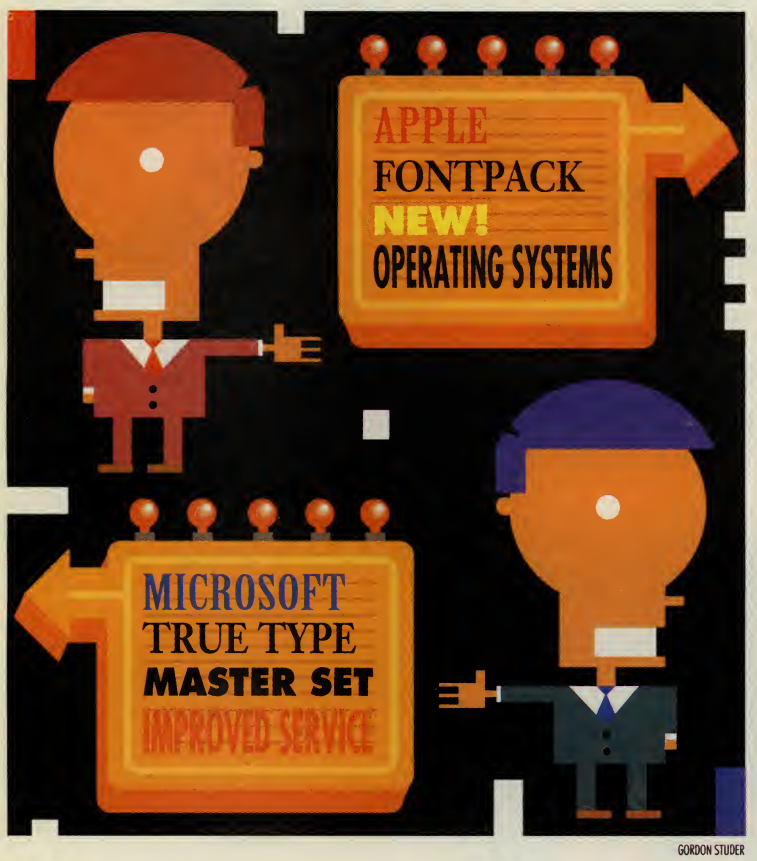

GORDON STUDER

MacInTouch RIC FORD

Picking apart products and services for PCs

Microsoft and Apple are selling TrueType font packages head to head, and a comparison is irresistible. How do the two products and the two companies stack up?

ISSUES & TRENDS

The form of flattery. Apple is turning more and more toward the Microsoft model, heading away from the low-margin hardware business toward a greener-looking software pasture.

As these corporate giants compete more directly with each other, smaller distinctions in design, pricing and service become more important for choosing between their products.

A pair of inexpensive TrueType packages now on the market highlights some of these differences.

Goods and services. The Microsoft TrueType Master Set and the Apple Font Pack for Macintosh both list for about $100 and sell through mail-order companies for about $70.

Microsoft's set of 102 fonts provides a broad selection of attractive and useful typefaces, along with a few offbeat choices. Apple's 43-font selection is rather limited. Eight of the Apple fonts are variations of Helvetica, and some of the others seem suitable only for unusual applications.

In documentation, Microsoft also provides more substance. The company's well-written user's guide is double the length of Apple's weak manual, and it includes an interesting and helpful discussion of each font, plus a bibliography.

Customer support offers some interesting contrasts between the companies. Microsoft actually warrants that its software will perform substantially in accordance with its documentation, while Apple disclaims responsibility for everything other than the floppy media.

Apple offers one year of toll-free phone support. A call to Microsoft is not toll-free, but the company also offers support services through CompuServe and special modems for the hearing-impaired.

Elements of style. Like graphical user interfaces, support departments have a certain look and feel, and I found quite a difference in style between Microsoft and Apple.

When you call Apple, you face three levels of an automated phone system and an examination from an androidlike support person before you are permitted to ask your question. Support personnel reveal only first names, but they require many details about you for the database.

Although it feels a little like Big Brother, the Apple system seems to be working, and it provided technical answers about fonts without much delay when I called.

Calling Microsoft, I got a real human after only one level on the phone menu. The human was a little confused about the existence of the new product, but he checked and found the proper support group.

While on hold for font support, Microsoft provided an odd simulation of a radio show, featuring bad synthesized music and a Microsoft disc jockey who reported support-line delay times like a morning traffic report.

Another friendly person answered the line after a wait of several minutes, covering the font question clearly and easily without the formalities of Apple's support. He also seemed genuinely concerned about straightening out the confusion that occurred at the first stage of the call.

Keep customers satisfied. Considering design, installation and support, the bottom line on the two font packs is that Microsoft offers more for the money. Apple's toll-free support line might save a few dollars, but the depth of Microsoft's type selection and documentation gives it a big advantage in this small product.

And that is the franchise that Microsoft constructed: delivering and supporting practical computing products at reasonable prices.

Apple's franchise is innovation. In this case, it might be a package of TrueType GX fonts with advanced hinting, if only QuickDraw GX were shipping. Timely delivery of innovative products is the only way Apple can compete successfully. Microsoft is too good at its own game to lose a head-to-head competition for software commodities. Let's hope that Apple is targeting the right goal as we head into a time of rapid change.

BUGS & TIPS

Font follies. A bug introduced with the new Fonts folder in System 7.1 could be a problem if you are working with many fonts on a Mac without a lot of RAM. The bug is triggered only on certain machines. Apple has not announced or released a fix, but we may see a patch soon from Joe Holt, a software engineer at Adobe Systems Inc.

What happens, Holt said, is that font resources are loaded into memory during the start-up process, and the bug prevents them from being purged when they are not in use. With a large complement of fonts, this can burn up a few megabytes of memory needlessly.

The bug is an instruction that looks at the wrong byte of memory. On various Macs, this byte is set to different values, so the instruction mistakenly restricts purging on the basis of unrelated factors.

Holt said he hopes to provide a patch for the bug in the next few weeks via on-line services and user groups. □

Comments on MacInTouch are welcome at 7 Parmenter Ave., Maynard, Mass. 01754. Phone (508) 897-2621. Address electronic mail to RICFORD on AppleLink or MCI Mail; to 72511,44 on CompuServe; or on the Internet to 72511.44@compuserve.com. Join us on-line in the MacWEEK Forum at location ZMC:MACWEEK on CompuServe or ZiffNet/Mac.

Ask David Ramsey

A surplus in the system

Q. How can I reduce the amount of memory used by my System file?

A. The bar labeled System Software in the About This Macintosh window does not really represent your System file ("System suitcase" in System 7 parlance). What it shows is memory used by everything in your Mac except applications.

This lump sum includes resources from the System file, any memory specified in the Disk Cache and RAM Disk sections of the Memory control panel, memory taken by things like Adobe Type Manager's font cache, and memory used by other extensions. (If you have more than 8 Mbytes of RAM and do not have 32-bit addressing turned on, the unavailable memory above 8 Mbytes is shown here, too.)

It's not at all that unusual for the amount shown in the System Software bar to approach 2 Mbytes on a typical Mac. The most common causes for a system using more than 2 Mbytes are running in 24-bit-addressing mode with more than 8 Mbytes of RAM, running a RAM disk and running a memory-hungry extension. The last is easy to check — start up with the Shift key held down and check About This Macintosh again.

Q. It takes one click to bring an application to the foreground and another click to do something. Is there some way to have one click do both, like it does in Windows?

A. Some Mac applications (such as the Finder) already do this; I'm surprised it's not more common. You can add this behavior by using ResEdit to turn on the Get Front Clicks bit in an application's SIZE resources. There can be as many as three SIZE resources (-1, 0 and 1), and you must change them all.

Q. How can I get rid of the black borders on my Apple 16-inch monitor?

A. Go to Radio Shack and get a set of color TV adjustment tools, which will run you about $5. On the left side of your monitor is a little, well-hidden drop-down door behind which are controls for adjusting image height, width and position. Use the flat screwdriverlike end of one of the tools to adjust these parameters to your liking. This voids your warranty, I'm sure.

Please send questions to David Ramsey on CompuServe: 76702,335 or to Ask David Ramsey, c/o MacWEEK, 301 Howard St., 15th Floor, San Francisco, Calif. 94105.

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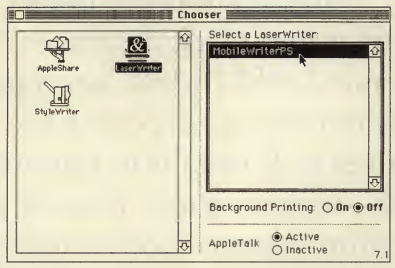

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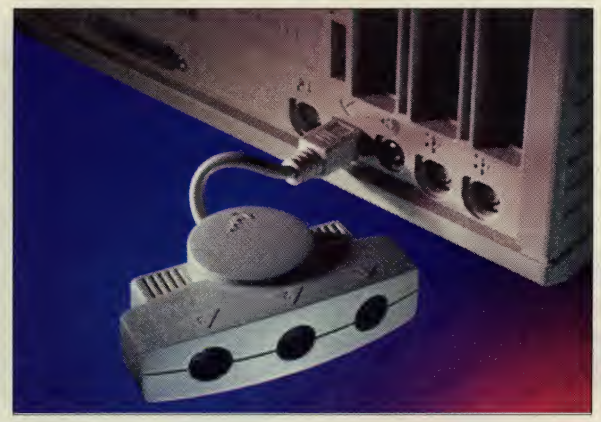

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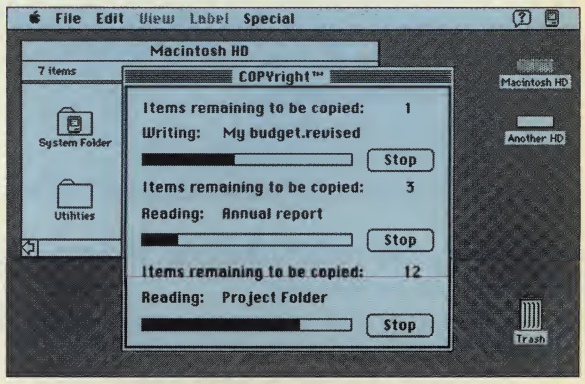

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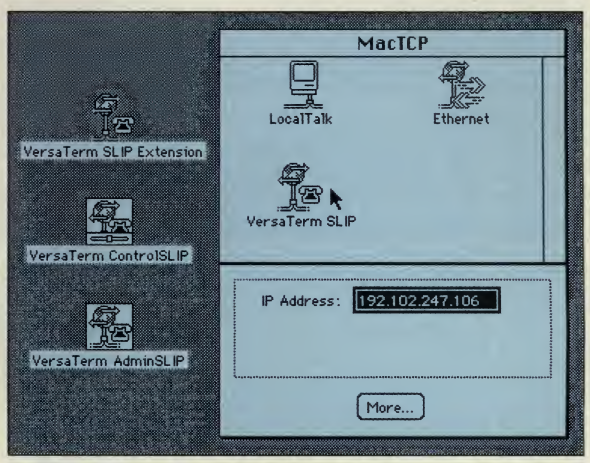

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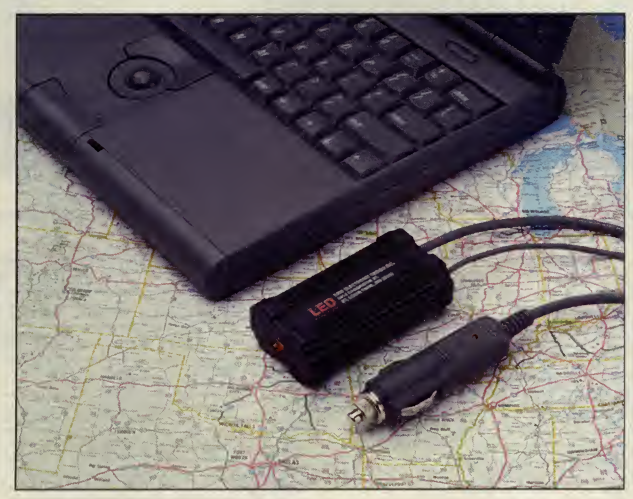

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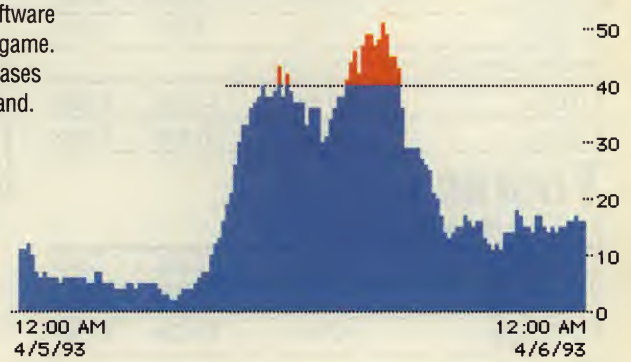

FileMaker Pro 2.0 §

Maximum enabled in histogram:	40
Peak requested in histogram:	51
Peak requested at:	3:14 PM 4/5/93
Peak usage in histogram:	40
Longest queue length in histogram:	11

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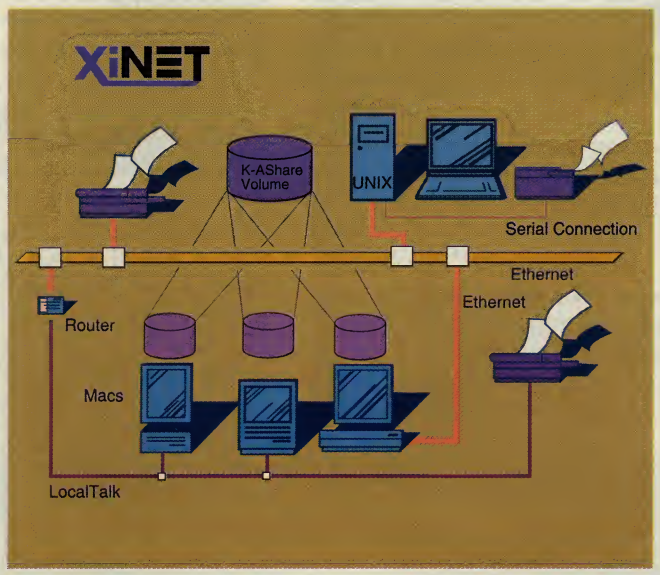

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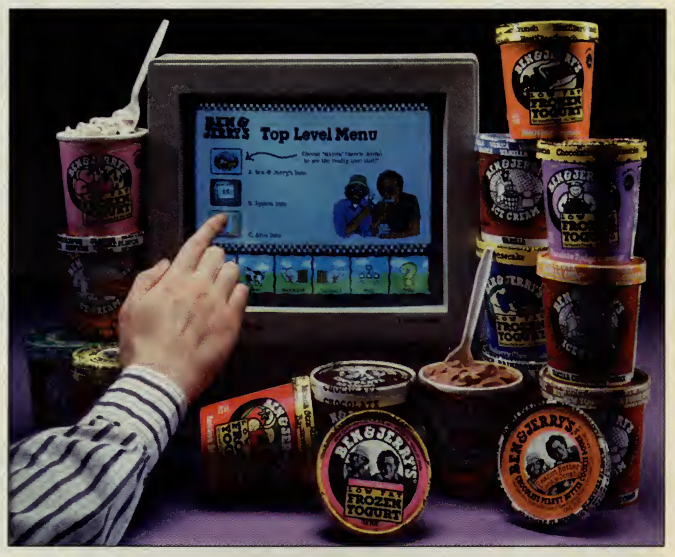

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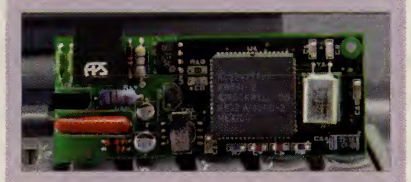

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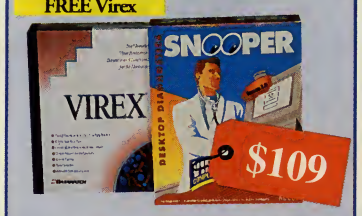

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Large 21", .28mm dot pitch, 135MHz, 1024x768 non-interlaced

$100 Rebate Get a $100 rebate from NEC when you purchase a MacFG 24Xp card with either a 15" or 17" MultiSync FG monitor. Offer ends June 30, 1993.

NEC MacFG24xp card. $549
24-bit color NuBus card with QuickDraw acceleration

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Radius™ PrecisionColor™ Pivot $929
15-inch, dual-orientation, anti-glare, color full page display .

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21-inch color display for Macintosh (NuBus™) computers. Displays two facing pages in a resolution of 1152x870 at 75 Hz and 78 dpi.

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19-inch, landscape, Two Page display display for Mac and PC computers. Mac resolution is 1152x 882 at 71Hz at 82 dpi.

Radius PrecisionColor Display/20S. $2329
20-inch multi-frequency Trinitron® color display for Macintosh and PC. "On-the-fly" resolution switching. Comes with PrecisionColor software

Radius Graphics Cards & Interfaces
Color Pivot Interfaces (NuBus, IIsi, LC, SE/30) **$499**
UniversalColor 24XP Card **$499**
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Versatile graphics card for fast 8-bit color & 16-bit color
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Spectrum/24™ PDQ+ **$1489**
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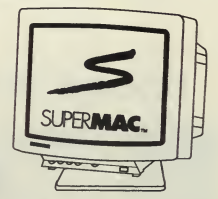
SuperMatch™ 17" Multimode Color $949
Low-cost large screen color display for business productivity. For Mac or PC.



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1024x768 full-page. Compatible with Quadra built-in video.

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Flexible viewing, realistic colors for design and publishing

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Large-screen 20" Trinitron color with unmatched versatility.

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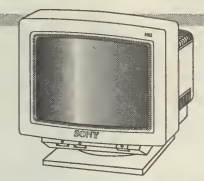
Sony CPD-1304S. $569
14" Trinitron®, .25mm, 1024x768 max. resolution



Sony CPD-1604S $1049
17" Trinitron Multiscan®, .25mm, 1024x768 max. resolution

Other Sony monitors available.

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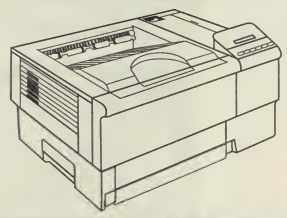
NEC

Silentwriter® Model 95fx with PostScript® Fax Option

$1149*



- Receive and print conventional faxes or high-quality PostScript faxes on plain paper
- 2MB RAM / 6ppm printing
- Automatically switches interface between Mac & DOS platforms
- 35 Adobe fonts / 14 HP fonts

Silentwriter Model 95f $949*
6 pages per minute; 2MB RAM; 35 Adobe fonts; 14 HP fonts. Automatically switches interface between Mac & DOS

Toner Cartridge for 95/97 ..... $165

***Price after $250 mail-in rebate from NEC. Offer ends 6/30/93**

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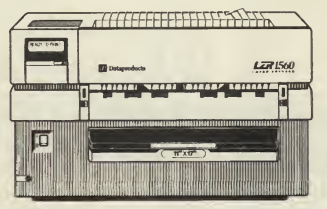
LZR 1560™ Ledger/A3 Laser Printer

$2999
with Two Trays



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LanRover/L is a dial-in server that provides PowerBook and Macintosh users with fast, easy, access to all network services.

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Shiva's multi-protocol, single-line remote networking server for AppleTalk and NetWare networks, includes a built-in V.32bis and V.42bis High-speed modem and Ethernet connector.

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LanRover™/E

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AppleTalk software router for LocalTalk & EtherTalk, & TokenTalk.

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Timbuktu is the easiest way to create a peer-to-peer network. Share peripherals and exchange files quickly and easily.

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CDR-25 with stereo speakers, stereo headphones, & 10 new CD titles.

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Fast 200ms access time, 330KB/sec double-speed performance, Toshiba mechanism, Kodak® PhotoCD™ ready; includes QuickTime™ and Apple PhotoCD Access software.

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Fast 200ms access time, 330KB/sec double-speed performance, Toshiba mechanism, Kodak PhotoCD ready; comes with Toolworks Multimedia Encyclopedia, MPC US Atlas, MPC World Atlas, Chessmaster 3000, Mavis Beacon, Power Tools for Windows, and Procom Audio Sampler.

Procom macCD/MX internal for Mac **$499**
internal for Quadra 800, 900, 950; Centris; or IIvx; 200ms; Toshiba mechanism, Kodak® PhotoCD ready.

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PROMETHEUS® PRODUCTS, INC.

NEW!

Prometheus® 14.4 Internal Modem **$259**
For PowerBook models 100 through 180
14,400 bps data and send/receive fax transmission.

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Supra FAXModem V.32bis. **$335**
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Connects Power-Book Duo to large screen displays, televisions, LCDs and projectors.

PowerLink DeskNet™ **$689**
The only desktop dock with full-speed Ethernet. Choose 10BaseT or Thin Ethernet.

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600 dpi color with PhotoShop®

Transparency/Slide Adapter for UC-630 ..... **$699**

UMAX UC-840. ..... **$1299**
800 dpi color scanner with PhotoShop®

UMAX UC-1200. ..... **$2999**
1200 dpi color scanner with PhotoShop®

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4MB SIMMs for LC III, Centris **$149**
8MB SIMMs for LC III, Centris **$299**
16MB SIMMs **$549**
16MB SIMMs for LC III, Centris **$599**
256K VRAM **$36**
4MB for PowerBook 160/180 ..... **$239**
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6MB for PowerBook 140/170 ..... **$229**
8MB for PowerBook Duo 210/230 ... **$419**
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Quantum

Unformatted Capacity	Model	Access Time	Actual MAC Capacity	Internal	External
GO • DRIVE (2.5" HARD DRIVES DESIGNED FOR POWERBOOKS)					
80mb	GO80	17ms	80mb	$289	$389
120mb	GO120	17ms	120mb	$339	$439
ELS SERIES (3.5" LOW PROFILE AND LOW POWER)					
42mb	ELS42	19ms	40mb	$169	$229
85mb	ELS85	17ms	82mb	$195	$255
127mb	ELS127	17ms	124mb	$229	$289
170mb	ELS170	17ms	160mb	$259	$319
LPS SERIES (3.5" LOW PROFILE)					
105mb	LPS105	11ms	100mb	$215	$275
120mb	LPS120	10ms	116mb	$269	$329
240mb	LPS240	10ms	234mb	$339	$399
525mb	LPS525	10ms	500mb	$869	$929
PRODRIVE SERIES (3.5" HALF HEIGHT)					
BEST BUY 425mb	PRO425	9ms	406mb	$739	$799
700mb	PRO700	10ms	670mb	$1099	$1159
1.0GIG	PRO1050	10ms	1001mb	$1219	$1279
1.2GIG	PRO1225	10ms	1165mb	$1359	$1419

GO•Drives carry a ONE Year Warranty. ELS drives, LPS drives, PRO drives carry a TWO Year Warranty.

Maxtor

*6300 RPM

Unformatted Capacity	Model	Access Time	Actual MAC Capacity	Internal	External
XT SERIES & MXT SERIES (3.5" LOW PROFILE)					
120mb	7120S	15ms	121mb	$209	$269
FAST!! 540mb*	MXT-540	8.5ms	521mb	$899	$959
207mb	7213S	15ms	202mb	$299	$359
LXT & MXT SERIES (3.5" HALF HEIGHT)					
340mb	LXT-340	15ms	324mb	$569	$629
FAST!! 1240mb*	MXT-1240	8.5ms	1150mb	$1449	$1509
PANTHER SERIES (5.25" FULL HEIGHT)					
1.2GIG	PO-12S	13ms	997mb	$1199	$1299
1.7GIG	P1-17S	13ms	1433mb	$1449	$1549

Maxtor drives carry a TWO Year Warranty.

TOSHIBA

Unformatted Capacity	Model	Description	Access Time	Actual MAC Capacity	Internal	External
NEW! 213mb	MK2224FB	2.5" Low Profile	12ms	207mb	$589	$689
1230mb	MK538FB	3.5" Half Height	12ms	1185mb	$1339	$1439

Toshiba drive carries a ONE Year Warranty.

IN STOCK!! NEW CLUBMAC 3.5" 105MB REMOVABLE

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SyQuest Drives include TWO Year Warranty, one cartridge and necessary cables, SCSI Director™ Formatting Utility. Warranty.

SyQuest Cartridges carry a ONE Year

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ClubMac 105mb External (SQ3105A)	$749
ClubMac 105mb Internal (Q900/950)	$719

CLUBMAC 88C REMOVABLES*

ClubMac 88c External (SQ5110C)	$555
ClubMac 88c Internal	$525
ClubMac 88c Dual	$999

* ClubMac 88c will read and write 44mb cartridges, but will not format 44mb cartridges.

CLUBMAC 44MB REMOVABLES

ClubMac 44mb External (SQ555)	$378
ClubMac 44mb Internal	$348
ClubMac 44mb Dual	$669

CLUBMAC 88MB REMOVABLES

ClubMac 88mb External (SQ5110)	$479
ClubMac 88mb Internal	$449
ClubMac 88mb Dual	$849

SYQUEST CARTRIDGES

105mb Cartridge	$79
44mb Cartridge	$63
88mb Cartridge	$97

Seagate

FEATURING...THE ELITE DRIVES

Unformatted Capacity	Model	Description	Access Time	Actual MAC Capacity	Internal	External
3.5" DISK DRIVES						
248mb	ST3283N	Low Profile	12ms	235mb	$365	$425
1.2GIG	ST11200N	Half Height	10.5ms	1000mb	$1149	$1209
WREN AND ELITE SERIES (5.25" FULL HEIGHT)						
645mb	ST4767N	Wren Runner II	11.9ms	634mb	$1069	$1169
1.2GIG	ST41200N	Wren-7	15ms	989mb	$1149	$1249
1.6GIG	ST41651N	Wren-8	15ms	1350mb	$1349	$1449
2.1GIG	ST42100N	Wren-9	12.9ms	1900mb	$1725	$1825
1.6GIG	ST41600N	Elite-1	11.5ms	1307mb	$1825	$1925
2.4GIG	ST42400N	Elite-2	11ms	2050mb	$2449	$2549
3.4GIG	ST43400N	Elite-3	11ms	2750mb	$3149	$3249

Seagate drives carry a ONE Year Warranty.

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TAPE BACKUP MEDIA

60 METER DAT	$13
90 METER DAT	$16
CT600N	$19
CT600F	$28
EXABYTE 8MM	$18

NOW SHIPPING WITH RETROSPECT V2.0 BACKUP SOFTWARE

Capacity	Model	Description	Media	Internal	External
155mb	Teac MT2ST/N50	Analog	CT600N	$429	$449
600mb	Teac MT2ST/F50	Analog	CT600F	$629	$649
500mb	Archive Vipor 500	Analog	DL6250	$679	$699
2.0GIG	Archive Python	DAT, DDS	4mm	$1049	$1069
3-5GIG	Archive Turbo DAT	DAT, DDS-DC	4mm	$1329	$1349
2.0GIG	WangDAT 1300XL	DAT, DDS	4mm	$1049	$1069
3-5GIG	WangDAT 3200	DAT, DDS-DC	4mm	$1339	$1359
2.0GIG	Hewlett Packard 35470A	DAT, DDS	4mm	$1269	$1289
3-5GIG	Hewlett Packard 35480A	DAT, DDS-DC	4mm	$1429	$1449
2-5GIG	Exabyte 8205	Helical/Compression	8mm	$1709	$1729
5-10GIG	Exabyte 8505	Helical/Compression	8mm	$2649	$2669

Includes RetroSpect v.2.0 Backup Software, One Tape and ONE Year Warranty

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SHARP INTERNAL OPTICAL IS PERFECT FOR THE MAC IIVX, CENTRIS 650 & Q 900/950

Model		Capacity	Description	Seek	Internal	External
CMO-M2511A	Fujitsu	128mb	3.5" Low Profile	35ms	$969	$999
CMO-OD3000	Teac	128mb	3.5" Half Height	45ms	$939	$969
CMO-3100E	Ricoh	128mb	3.5" Half Height	45ms	$1045	$1075
CMO-JY750	Sharp	594/652mb	5.25" Half Height	40ms	$2119	$2149
CMO-5031E	Ricoh	594/652mb	5.25" Full Height	28ms		$2345
CMO-Tahiti II	MaxOptix	650mb/1.0GIG	5.25" Full Height	35ms		$3149
128mb Cartridge		3.5" Single Sided				$39
594/652mb Cartridge		5.25"-512/1024 bytes/sec				$95

All ClubMac Opticals include ONE cartridge and ONE Year Warranty.

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DAYSTAR DIGITAL

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*POWERCACHE ADAPTER NOT INCLUDED W/O FPU W/ FPU
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40 MHZ POWERCACHE* ..... $545 ..... $635
50 MHZ POWERCACHE* ..... $715 ..... $845
EQUALIZER LC ..... $169 ..... $239
POWERCACHE ADAPTER $41

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FASTCACHE IICI $199
FASTCACHE QUADRA - Q700/900 ..... $249
FASTCACHE QUADRA - Q700/900/950 ..... $375

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- NuBus-based processor, powered by the 33MHz Motorola 68040
- Increases processing speed of the original Mac up to 8 times even exceeding Quadra performance in most cases

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BRONZE (24/96 S/R FAX MODEM) $189
SILVER (96/96 S/R FAX MODEM) $359
GOLD (14,400 S/R FAX MODEM) $419

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1MB / 4MB / 16MB FX ..... $36 / 135 / 555

CENTRIS 610/650/LCIII

4MB / 8MB / 16MB ..... $135 / 265 / 545

DUO 210/230

4MB / 8 MB ..... $225 / 319

POWERBOOK 140/145/170

4MB / 6MB ..... $160 / 219

POWERBOOK 160/180

4MB / 6MB ..... $175 / 249
8MB / 10MB ..... $335 / 415

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8MB / 16MB LOW PROFILE ..... $329 / 575

QUADRA 800

4MB / 8MB / 16MB ..... $170 / 305 / 715

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16MB $585

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256K VRAM FOR QUADRAS $23
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NEC

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20 MULTIMODE COLOR (2085H) $1299
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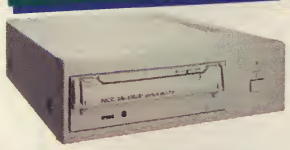
KODAK'S MULTISESSION PHOTO CD COMPLIANT

NEC



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- 280ms access times
- SCSI-2 compatible
- 256k cache
- MultiSpin Technology
- TWO Year Warranty

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VIDEOSPIGOT IISI* / LC $299/245
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VIDEOSPIGOT PRO IISI** $1039
SPIGOT & SOUND / PRO ** $499/1125
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TOSHIBA CD ROM $719

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THK/THN/10BT, 32K $199
THK/10BT, 32K $149

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ASANTEPRINT, THK/THN $319
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MAC II FAMILY, PERFORMA 600 (NUBUS)

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THK/THN, 64K $149
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MAC IISI & SE/30 (030 PDS)

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THK/THN, 64K, FPU CHIP $245

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NEC

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SILENTWRITER 97FX (BUILT-IN PS FAX) ..... $1479 *
* AFTER MANUFACTURER'S $250.00 REBATE, OFFER ENDS 06/30/93

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600 MB Hyperspace 5.25" 28ms Access time, 1MB/sec Trans, free cart. .$2598

- MacWorlds Editors Choice!
- Super access time and unlimited storage
- Lowest cost per megabyte for disk storage
- Comes with FWB Hard Disk Tool Kit
- "Fast, inexpensive, good technical support, a rare combination of qualities in a storage device." MacWorld

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5.0 Gig with Retrospect, Includes free 90m DAT $1458
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- Up to 2.1 Gig per tape
- Our best buy ever on DAT!
- Up to 10 mb per minute backup time
- Available with a complete version of Retrospect or SoftBackup

Hot Hard Drive Prices From Mac Direct!

Fujitsu Specials!
520mb 3.5" Internal $788
1.2 Gig 5.25 Internal $1288
2.4 Gig 5.25 Internal $2448

Conner Drives

		Internal	External
C 42 MB	3.5" LPS, 2 yr warr,150,000 MTBF	$168	$218
C 85 MB	3.5" LPS, 2 yr warr,150,000 MTBF	$198	$258
C 120 MB	3.5" LPS, 2 yr warr, 150,000 MTBF	$248	$308
C 170 MB	3.5" LPS, 2 yr warr, 150,000 MTBF	$278	$338
C 212 MB	3.5" LPS, 9ms, 2 yr warr, 150,000 MTBF, Fast SCSI	$358	$418
C 540 MB	3.5" 8.5 ms, 2 yr Warr,150,000 MTBF, Fast SCSI	$898	$958

These new Conner drives are so reliable, that Conner has been one of Apples largest suppliers of drives. The 150,000 hours Mean Time Between Failure and the incredible speed of the 540 are just two reasons to buy a Conner.

Fujitsu Drives

		Internal	External
520 MB	3.5" 9ms, Fast SCSI, 5yr warr, 200,000 MTBF	$788	$888
1.1 Gig	3.5" 8.5ms, 5yr warr, 300,000 MTBF, Fast SCSI	$1598	$1658
1.2 Gig	5.25" 11.5ms, 5yr warr, (MacWorlds Fastest Gig!) Fast SCSI	$1288	$1388
2.06 Gig	5.25" 11.5ms, 5yr warr, 300,000 MTBF, Fast SCSI	$2288	$2388
2.4 Gig	5.25" 11.5ms, 5yr warr, 300,000 MTBF, Fast SCSI	$2448	$2548

*Mean Time Between Failure is the average life expectancy of a drive.

Toshiba Drives

		Internal	External
1.2 Gig	3.5" 12.5ms, 256 cache, SCSI-2, Internal for CI,Quadra	$1248	$1298
830 MB	3.5" 12.5ms, 256 cache, SCSI-2, Internal for CI,Quadra	$998	$1098

213 MB 2.5" PowerBook Drive

- 213mb inside your PowerBook!
- Fast, quiet, low power
- Fastest drive available for the PowerBook,
- Only 0.12 watts power usage in sleep mode and 3.0 during access

Internal kit $548
External with battery $648
PowerBook Cable $30

Seagate Drives for audio/video editing

		Internal	External
1.2 Gig	3.5" 10.5ms, 1 Yr warranty	$1348	$1398
1.2 Gig Wren 7	5.25" 15ms, 1 Yr warranty	$1198	$1298
1.6 Gig Wren 8	5.25" 15ms, 1 Yr warranty	$1698	$1798
2.1 Gig Wren 9	5.25" 12.5ms, 5 Yr warranty	$1898	$1998
1.6 Gig Elite 1	5.25" 11.5ms, 1 Yr warranty	$1848	$1948
2.4 Gig Elite 2	5.25" 11ms, 5 Yr warranty	$2548	$2648
3.4 Gig Elite 3	5.25" 11ms, 5 Yr warranty	$3428	$3528

CD ROM Drives from Toshiba

Toshiba 3401 "Kodak photo CD" Multisession, 200ms access time, ...$498

60 East Chestnut - 145, Chicago, IL 60611

No charge, Visa or Mastercard, Amex accepted, COD, Telecheck Approved Checks, Gov., Corp., Univ., P.O.s welcome. All new drives, preformatted with latest stable system software. Factory warranty. Bracket, cables and software included. 30 Day Money back Guarantee covers drive products only. Return Authorization number required for returns. Prices, terms and availability subject to change without notice.

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SAMPO 20" Color System
998.00
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Sampo 20"

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Mono System.....$698.00
Grey Scale System.....$998.00

- The SAMPO is a high quality display without the high cost!
- Includes 1 bit, or 8 bit Bit Video board and cable
- Display supports all Mac's
- Resolution 1024 x 768 at 72 DPI

Trinitron 20" Color System

Monitor Only for Quadra & Centris.....$1898.00
8 and 24 bit RasterOps interface available .....Call

- The Trinitron-20 is a 20" monitor incorporating Sony's patented technology and one of our best buys! True Trinitron color at a great price!
- Display supports all Mac's

Get the Big Picture with MacDirect Monitors

16" SONY Trinitron
$1098

- Plug compatible Quadra, Centris
- Plug compatible SI, CI, LC's at 640x480

NuDesign Full Page Display
$398

- Plug compatible with SI,CI, LC III, Centris 610 & 650 and Quadra's
- 1 Bit System available for all macs 488.00

NuDesign Full Page Grey Scale $398.00
With 1 Bit Interface Card $488.00

- Plug compatible with Si, Ci, LC III, Centris 610 & 650 and Quadra (16 levels of Grey).
- 1 Bit System available for all macs

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Pro Ultima Home Office	$408	Zoom Faxmodem PBK	$129
Promodem 144i	$288	Zoom Faxmodem PKT Portable	$149
Promodem 144e	$288		
Promodem 24e	$138	Zoom Faxmodem FXV	$188
Promodem Mini 2400	$89	Zoom Faxmodem FXV.32	$308

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SAMSUNG 300 dpi Printer $1298.00
1200 DPI Upgrade *(Available in May)*.....$998.00

- Incredible 1200 dpi upgradeability allows for future growth
- SAMSUNG is one of the worlds largest electronics companies!
- IncludesPostScript and PCL-5 compatibility
- Intensly fast Intel i960 RISC processor

Call About Simms!

Model	60 NS	70 NS	80 NS
1x8	Call	Call	$33
2x8	Call	Call	$63
4x8	Call	Call	$133
8x8	Call	Call	$279
16x8 FX	Call	Call	$549
16x8 Q950	Call	Call	$515

Memory for LCIII, Centris 610, 650
4mb....Call 8mb.....Call
16mb .....Call

We carry most Mac Memory, Please Call for prices!

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Umax UC-630 With *PhotoShop 2.5*.....$1098.00
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- Rated four mice by MacUser (Dec '91)
- Rated fastest by MacUser(Dec '91)
- "Boasts the highest vertical resolution..."Umax produced the best images..." excel(s) in speed and color accuracy" MacUser

Umax UC-1200S With *PhotoShop* 2.5 .....CALL
Transparency/Slide Scanner Option.....$798.00

- Sncredible 1200 dpi scanning res. recognizes 1 billion colors internally
- Single-pass design increases scanning speed
- Includes Adobe Photoshop 2.5

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- An incredible OCR package with over $1000 in software alone,

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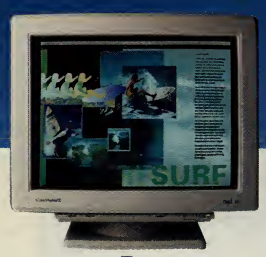
HARDWARE THAT FITS



A radius

B SUPERMAC

C RASTEROPS THE ART & SCIENCE OF COLOR

D MITSUBISHI

E NEC

F SII

G SONY

H Real Tech

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"My experience in running large retail organizations for more than 16 years was the person at the top normally heard from customers only when things 'had not gone according to Hoyle' somewhere down the line. I would like to be the exception and bring to your attention my experiences of outstanding service from two of your employees during my recent purchase of a RealTech 19" monitor and RasterOps 24XLi card...their responsive service was a refreshing change."

— Stephen E. Snider

* E-Machines 16" Color (ColorPage T16)

E-MACHINES

* SuperMatch 20•T Multi-Mode XL

SUPERMAC

GUARANTEED 100% TO PLEASE

Monitors: all sizes, brands & prices

Need help choosing a monitor? Not sure if you need one that auto-syncs? Call our friendly sales team. They're happy to answer your questions.	Price	Tube type	640 x 480	640 x 870	832 x 624	1024 x 768	1152 x 870	Auto-syncing	Anti-glare
A. Radius 21" Color	$3,069	Hitachi					■		■
NEC 21" 6FG Color	2,699	NEC	■		■	■	■	■	
SuperMac 21" Mono/Grayscale	989	—					■		■
B. SuperMac 20" (SuperMatch)	$1,499	Hitachi				■			■
C. NEW! RasterOps 20" Trinitron Multi-Mode	2,359	Trinitron	■		■	■	■	■	■
* RealTech 20" Trinitron Multi-Mode	1,895	Trinitron	■		■	■	■	■	■
NEW! Radius IntelliColor 20"	2,759	Trinitron	■		■	■	■	■	■
RasterOps 20" Hitachi Color	1,329	Hitachi	■		■	■		■	■
* NEW! SuperMatch 20•T Multi-Mode XL	2,699	Trinitron				■	■		■
E-Machines 19" Color (T19 II)	2,399	Trinitron				■	■	■	■
D. Mitsubishi 17" Diamond Pro	$1,199	Trinitron	■		■	■	■	■	■
E. NEC 17" 5FG Color	1,539	NEC	■		■	■	■	■	
F. Seiko Instruments 17" CM1760LR	1,249	Trinitron	■		■	■		■	■
G. Sony 17"	1,149	Trinitron	■		■	■		■	■
H. RealTech 17" Multi-Mode	995	Hitachi	■		■	■		■	■
I. RasterOps 16" (RasterOps Sweet 16)	$1,199	Panasonic			■				■
* E-Machines 16" Color (ColorPage T16)	1,299	Trinitron	■		■	■		■	■
J. NEC 15" 4FG Color	899	NEC	■		■	■		■	
K. Radius 15" Precision Color Pivot	$959	Non-Trinitron	■	■	■	■		■	■
L. Sigma 15" Grayscale (PageView GS)	579	Phillips		■					■
M. RealTech 15" Grayscale	449	—		■					■
Sigma 15" Grayscale (Power Portrait)	659	Phillips		■					■
NEC 15" 3FGX Color	669	NEC	■		■	■		■	
N. Seiko Instruments 14" Color (CM1445)	$499	Trinitron	■						■
O. Sony 13" Color	689	Trinitron	■						■

* shown above

Your Hardware That Fits partner will tell you which monitors are on-board compatible, and which ones require a card or cable.

Don't know which card is compatible with your CPU & monitor? Call us toll-free.	Price	Maximum resolution	Accelerated
RASTEROPS			
ProColor 32	$3,099	1152 x 870	■
PaintBoard 24	1,559	1152 x 870	■
8XL	469	1152 x 870	
PaintBoard Li (24)	829	1024 x 768	■
*24STV**	779	640 x 480	■
*MediaTime**	1,549	640 x 480	
SUPERMAC			
Spectrum/24 PDQ Plus	$1,549	1152 x 870	■
Spectrum/8 NuBus	419	1024 x 768	
Spectrum/8 LC II, IIsi	499	1152 x 870	
Spectrum/24 Series IV	829	1024 x 768	■
Spectrum/8•24 PDQ	829	640 x 480	
Spectrum/8•24	579	640 x 480	
Thunder 24	2159	1152 x 870	■
ThunderLight	1669	1152 x 870	■
*Video Spigot**	369	160 x 120	
*Video Spigot & Sound**	479	160 x 120	
RADIUS			
Precision Color 24X	$1,649	1152 x 882	■
Precision Color 8XJ	499	1152 x 882	■
Precision Color 24XK	829	1024 x 768	■
Precision Color 24XP	499	832 x 624	■
*Video Vision**	1,979	640 x 480	
E-MACHINES			
ColorLink DC/T (8-bit with Ethernet)	519	1024 x 768	■
ColorLink SX/2 (24-bit with Ethernet)	649	1024 x 768	■
Futura SX24	499	1024 x 768	■
DoubleColor LX (8)	699	1152 x 870	■

**24-bit; captures up to 30 frames per second*

Wacom Cordless Digitizing Tablets

$489

Lease: $60/mo.

Cordless, pressure sensitive stylus translates your penstrokes into line width, spray density, color changes, and other programmable effects. Paint, draw, trace, and point as naturally as if you were writing. The standard tablet has a plain surface. The electrostatic tablet is ideal for video graphics, photo retouching, and print prepress work.

Wacom ArtZ Graphics Tablet

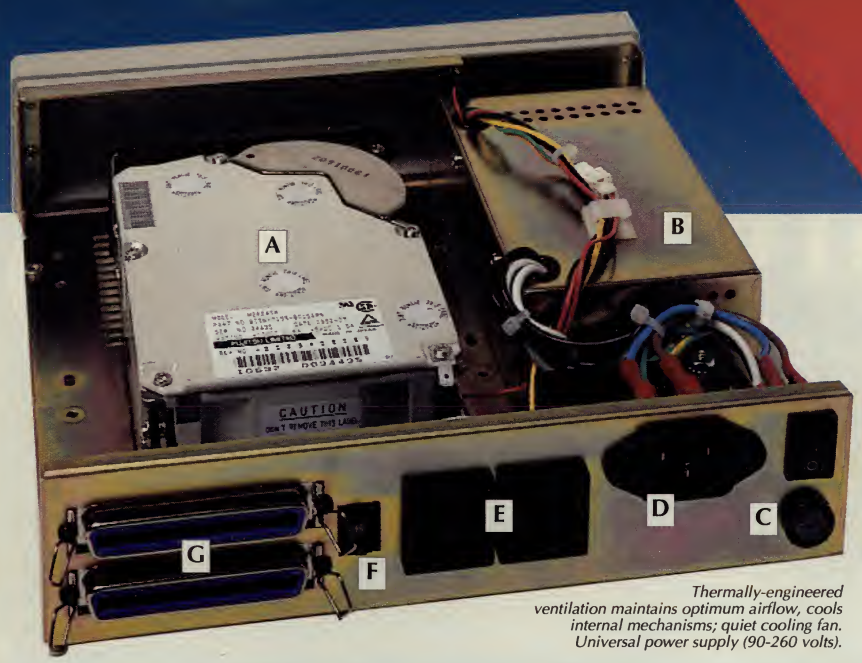
6" x 8" High Speed ADB $319

Wacom (SD Series)

6" x 9" Standard $489
12" x 12" Standard 689
12" x 12" Electrostatic 759
12" x 18" Standard 1029
12" x 18" Electrostatic 1099

Your one-stop source for Mac solutions.

Hard drives



Thermally-engineered ventilation maintains optimum airflow, cools internal mechanisms; quiet cooling fan. Universal power supply (90-260 volts).

Name-brand mechanisms in the highest-quality enclosure available

WHY OUR DRIVES ARE SUPERIOR

- *Fast access times*
- *top-level warranties on all mechanisms*
- *2-year warranty on enclosure*
- *and...*

A. *We use the highest quality name-brand mechanisms available; fully tested and burned in*

B. *Shielded 40 watt power supply (65 watt for FH drives) provides an additional margin of safety from electrical interference, keeping your data free of corruption*

C. *External fuse keeps fuse replacement simple*

D. *Power cable plug-in*

E. *Two switched outlets provide power to additional peripherals, allowing 1-step system power-up*

F. *Easy-to-use pushbutton SCSI I.D. selector switch*

G. *Two 50-pin SCSI connectors for simple configuration*

(Not shown) Premium double-shielded 26-inch Mac-to-SCSI cable prevents electronic interference

Do you need a fixed hard drive, or the flexibility of a floptical? Call us; we can explain your options.	Model number	Internal price	External price	Formatted Mac capacity (in MB)	Average access time (in ms)	Transfer rate* (in Mb/second)	Form factor**	Warranty (years)
80 - 120 MB								
Conner 85	CP-30080E	$209	$279	82	17	1.5	LP	1
Quantum 85	ELS85	205	275	82	17	1.4	LP	2
Conner 120	CP-30100	259	329	116	17	1.5	LP	1
Maxtor 120	7120XT	229	299	121	15	1.5	LP	2
120 - 250 MB								
Quantum 127	ELS127	$259	$329	124	17	1.4	LP	2
Conner 170	CP-30170E	289	359	160	9	1.5	LP	1
Quantum 170	ELS170	279	349	160	17	1.4	LP	2
Conner 212	CP-30200	369	439	206	12	2.5[1]	LP	1
Maxtor 213	7213	329	399	207	15	2.8	LP	2
Quantum 240	LPS240	369	439	234	10	1.4	LP	2
Maxtor 245	7245	359	429	245.6	15	3.0	LP	2
320 - 570 MB								
Maxtor 340	LXT-340	$599	$669	324	15	2.1[1]	HH	2
Fujitsu 520	M2624FA	899	969	496	9	2.7[1]	HH	5
Quantum 525	LPS525	929	999	500	10	3.2[1]	LP	2
Maxtor 540	MXT-540	969	1039	546	9	5.5[1]	HH	2
Conner 540	CP-3540	899	969	515	12	5.5[2]	HH	1
Micropolis 560	M2105	1069	1139	560	10	5.0[2]	HH	5
700 MB - 1.3 GB								
Quantum 700	PRO700	$1249	$1319	700	10	2.9[1]	HH	2
Micropolis 800	M2108	1349	1419	698	10	5.0[1]	HH	5
Toshiba 877	MK-438FB	1099	1169	830	12.5	3.0[1]	HH	2
Quantum 1050	PRO1050	1419	1489	1000	10	2.9[1]	HH	2
HP 1050	97558	1649	1749	987	13.5	2.8[1]	FH	5
Fujitsu 1.2	M2266	1249	1349	1079	14.5	3.0[1]	FH	5
HP 1.2	C2247	1589	1659	1000	10.5	5.3[1]	HH	5
Micropolis 1.2	M2112	1449	1519	1005	10	5.0[1]	HH	5
Quantum 1.2	PRO1225	1599	1669	1200	10	2.9[1]	HH	2
Toshiba 1.2	MK-538FB	1399	1469	1200	12.5	4.0[1]	HH	3
Maxtor 1.2	MXT-1240	1549	1619	1240	9	4.5[1]	HH	3
Conner 1.3	CP-31370	2059	2129	1030	10.5	6.0[1]	HH	1
1.5 - 3.6 GB								
Micropolis 1.5	M1528	$2299	$2399	1341	14.5	2.9[1]	FH	5
Micropolis 1.6	M1548	2379	2479	1748	14	4.8[1]	FH	5
Fujitsu 2.0	M2652	2299	2399	1752	11	4.8[2]	FH	5
Seagate 2.1	ST42100N	1999	2099	1900	12.9	3.9[2]	FH	5
Fujitsu 2.4	M2654	2549	2649	2000	11	4.8[2]	FH	5
Micropolis 2.4	M1924	2649	2749	2100	11.5	4.5[2]	FH	5
Seagate 2.4	ST42400N	2879	2979	2050	11s	4.5[2]	FH	5
HP 2.4	C3010	2899	2999	2000	11.5	5.3[2]	FH	5
Seagate 3.4	ST43400N	3999	4099	2750	11	6.0[2]	FH	5
Micropolis 3.6	M1936	4199	4299	3022	12	6.0[2]	FH	5

* Transfer rate (or throughput) depends on your Mac CPU and system configuration. For more information, ask your Hardware That Fits sales partner. ***Form Factor Low Profile (LP)=3.5 Half Height (HH)=3.5 Full Height (FH)=5.25*

[1] SCSI-2 [2] SCSI-2 Fast ***These drives are most efficient when used with a Macintosh Quadra 800, 950 or a RealTech SCSI-2 card.***

REMOVABLES*

REALTECH® FLOPTICAL®

21 MB Drive w/1 disk *$339*
Drive w/Diskette 5-pack..... *399*

REALTECH MAGNETO-OPTICAL

128 MB Epson Drive w/1 disk (29 ms access time; 1 yr. warranty)..... *$1069*
Drive w/Diskette 5-pack..... *1229*

Maxoptix Tahiti IIm Drive (652/1.0 GB capacity; 35 ms access time; 1 yr. warranty) .. *$3269*

REALTECH TAPE BACKUP

Includes Retrospect 2.0 backup software.
TEAC 155 MB Drive *$499*
TEAC 600 MB Drive *749*

REALTECH DAT

DDS-DC Drive (2-8 GB capacity; 1 yr. warranty; includes Retrospect 2.0 backup software)..... *$1399*

The RealTech DAT Drive uses industry-standard DDS-DC compression on a 90-meter tape. Depending on your data, storage capacities may vary from 2 to 8 GB.

SYQUEST®

44 MB Drive *$389*
88c MB Drive *599*

REMOVABLE MEDIA

21 MB Floptical Diskette *$21*
5-pack of Floptical Diskettes *105*
128 MB Optical Diskette *$49*
5-pack of Optical Diskettes *209*
652 MB M-O Cartridge *99*
1.0 GB ZCAV M-O Cartridge *239*
155 MB TEAC Tape *$19*
600 MB TEAC Tape *28*
60-meter DAT Tape *$13*
90-meter DAT Tape *16*
44 MB SyQuest Cartridge *$63*
88 MB SyQuest Cartridge *97*

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Included with your drive, for efficient operation. Disk partitioning; password protection; diagnostic testing; multiple SCSI-bus support; extensive on-line help; and more. Also included with your drive, System 7.0.1.

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Allows all NuBus Macs to communicate with newer, high-performance hard drives at substantially faster transfer rates. Sustained transfer rate of up to 4.4 MB per second, plus a burst transfer rate of 6 MB per second (6/10 on a Quadra). Mirroring capabilities. *$299*

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To a lot of you, we've become a trusted business partner. So when you told us we needed to offer you more storage options, we listened.

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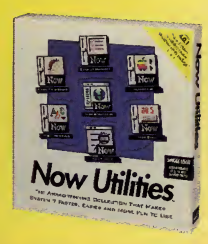
During the past eight years, we've become America's one-stop source for Macintosh solutions. Now we can be your one-stop source for storage solutions, too. Because we're the company you can trust to give you the very best...

- **QUALITY**
- **SERVICE**
- **VALUE**

Stack up our drives against the "best of the best" and they'll come out on top. You can trust us to always bring you the highest-quality Mac hardware!



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Includes 7 powerful utilities: Startup Manager, Super Boomerang, WYSIWYG Menus, Now Profile, Now Scrapbook, Now Save, Now Menus. Use Now Utilities to maximize System 7's capabilities, and to simplify using your Mac.

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Internal, ZFP™, ZFP+™, & Tsunami™ Drives

All drives have switchable active termination, efficient, quiet fans and universal power supplies.*

Quantum	Internal	Closeout! ZFP	Tsunami
40MB (3½")	$159	$219	$279
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120MB (3½")	$269	$329	$389
127MB (3½")	$249	$309	$369
170MB (3½")	$269	$329	$389
240MB (3½")	$359	$419	$479
525MB (3½")	$889	$949	$1009
700MB (3½")	$1179	$1239	$1299
1.05GB (3½")	$1319	$1379	$1439
1.2GB (3½")	$1479	$1539	$1599

Seagate	Internal	ZFP+
1.6GB (5¼")	$1749	$1899
2.1GB (5¼")	$1849	$1999
2.4GB (5¼")	$2689	$2839

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Optional PocketDock Cable	$59
Extra T-Connector	$59
110V Accessory Kit	$69

Powerbook Internals

Includes brackets & instructions.

80MB Powerbook Internal	$299
120MB Powerbook Internal	$359
160MB Powerbook Internal	$499

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Macweek

*Call for details on terms, conditions, limited money back guarantee and free offers. System 7.0.1 software included only with certain configurations. ZFP+ Drives do not have switchable termination. Prices do not include shipping and only apply to products shipped within the continental United States. Please contact La Cie for international distribution. Add sales tax where applicable. ZFP, ZFP+, Cirrus, Tsunami, PocketDrive, PocketDock, ExpressDrive, Silverscanner, Silverscan, Silverlining, La Cie and the La Cie logo are trademarks of La Cie, Ltd., a Quantum Company. FORTUNE 500 is a registered trademark of the Time Inc. Magazine Company. All other trademarks are the property of their respective companies. All prices, specifications, terms, descriptions, products and services herein are subject to change without notice or recourse. © Copyright 1993 La Cie, Ltd. 8700 SW Creekside Place, Beaverton, OR 97005. Phone: (503) 520-9000, Fax: (503) 520-9100. All rights reserved. Printed in U.S.A.

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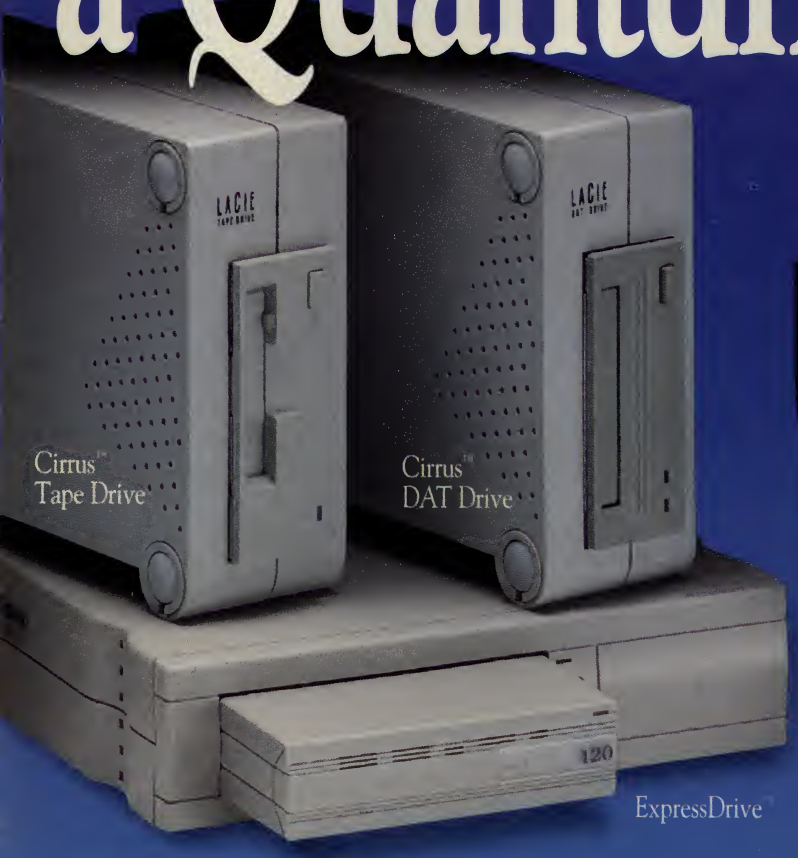

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44 ZFP™
44/88C ZFP™
Removable Drives

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ExpressDrive™

New lower prices! Limited time offer*

ExpressDrive Chassis	$289
50MB Quantum LPS Drive	$349
100MB Quantum LPS Drive	$399
120MB Quantum LPS Drive	$439
240MB Quantum LPS Drive	$539

Cirrus™ Optical

Includes one free cartridge.

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	Internal	External
128MB 3½" Optical	$1399	$1499
Drive with Retrospect	$1499	$1599
128MB Optical Disk	$79	

Silverlining™

Hailed as one of the most powerful and useful hard disk management software available, Silverlining offers unique features found no where else!

Silverlining	$149

ZFP™ Removable

Includes 1 free cartridge.

44MB Drive	$599
88MB Drive (88C)	$719
105MB 3½" Drive	$779
44MB Cartridge	$79
88MB Cartridge	$119
105MB 3½" Cartridge	$139

Cirrus Backup

Includes Retrospect™ and 1 free tape.

	Internal	External
155MB Tape Drive		$629
600MB Tape Drive	$849	$949
1.3-2.0GB DAT	$1439	$1539
4-8GB Comp.DAT	$1549	$1649

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Our next generation Silverscanner can really perform! Superior line art, detailed gray-scale and gorgeous color are the trademarks of this one pass, 24bit, high resolution, feature- packed scanning machine. Just scan it!

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Our high capacity Spin Drives come with speed-demonesque mechanisms from DEC, Seagate and Fujitsu. Check the chart at the right for blazing access times, and throughput rates. Available in Internal, Zero Footprint and Compact enclosures. (Compact pictured)

Spin/DEC DSP 3105 1 GB Drive (internal)	**$1249.00**
Spin/Seagate ST-11200N 1 GB Drive (internal)	**$999.00**
Spin/Fujitsu M2694 FA 1 GB Drive (internal)	**$1399.00**

NEW!

The latest in removable technology: It's small. But big. Small due to its Lilliputian footprint. Big because it accepts 3.5-inch media holding 105 Megs.

The Spin 3.5-inch Syquest Drive w/cart	**$699.00**

The Toshiba mechanism in this drive is double speed – in a word, whoosh, making the Spin CD ROM perfect for Photo CDs and MultiSession applications.

Toshiba Double Speed CD ROM Drive	**$549.00**
The Double Spin CDR 84 CD ROM Drive	**$449.00**

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SyQuest 5110C 44/88 SyQuest Drive w/cart.	$585.00
SyQuest 88 MB Removable w/cart.	$485.00
SyQuest 44 MB Removable w/cart.	$385.00

THE SPIN 3.5 OPTICAL DRIVE

Small footprint. Small pricetag: under $1000. It accepts ISO standard 128 MB capacity 3.5-inch cartridges compatible with other machines. Exclusive 2-yr warranty.

The Spin 3.5 Optical Drive w/cart.	$999.00

THE LOWEST MEDIA PRICES ANYWHERE

SyQuest unformatted 44 MB	$61.00
SyQuest unformatted 88 MB	$99.00
SyQuest formatted 44 MB	$69.00
SyQuest formatted 88 MB	$105.00
SyQuest 105 MB 3.5-inch cartridge	$71.00
Optical 3.5-inch cartridge	$35.00
DAT 90 meter (4mm)Tape Cassette	$17.00
CD-ROM Caddy	$8.00

THE SPIN DAT DRIVES

If it's your job to archive a ton of files, choose one of our Spin DATs. Standard DAT holds 2 GB. Compression model, up to 8 GB. Includes DANTZ Retrospect®, version 2.0

Spin Standard Dat	$1199.00
Spin Compression Dat	$1349.00

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MORE THAN JUST A LOW PRICE.

Flip through these pages (not right now, it's just a figure of speech), and you'll see a lot of low prices. The difference with Spin is that you get more. And not just a little more. We include many free things that others charge you for. Like a double-shielded SCSI cable. External terminator. A power supply designed for constant use. Not to mention our own Spin Disk Utilities with free upgrades for a year, system software, and unlimited tech support as long as you own a Spin drive. We aim to please. Call one of the other guys and ask what they'll give you for free. The cardboard box? The owner's manual? Then call us back.

30 DAYS TO DECIDE.

If you're not satisfied, neither are we (we're referring, of course, to Macintosh peripherals only). That's why every Spin product comes with a 30-day money back guarantee. Test-drive any Spin product. Give it a real workout. If you're not happy, return it within 30 days for a refund. Was that good for you?

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ZERO FOOTPRINT DRIVES

There's a Spin Zero Footprint drive for every application. They include everything you need to get up and running. Check this chart for specs and prices.

Capacity (MB)	Model Number	Average Access Time (msec)	Transfer rate (K/sec)	MTBF (Hours)	MFG warranty (months)	Internal Drive Price	Zero Footprint Drive Price	Compact Drive Price
Connor								
85	CP-30080E	16	1300	150000	24	$199	$259	
120	CP-30100	16	1300	150000	24	$259	$309	
170	CP-30170E	16	1400	150000	24	$269	$329	
213	CP-30200	15	2000	150000	24	$349	$399	
Quantum								
85	ELS 85S	17	1800	250000	24	$199	$269	
127	ELS 127S	17	1800	250000	24	$229	$299	
170	ELS 170S	17	2000	250000	24	$259	$329	
240	LPS 240S	16	2300	250000	24	$329	$399	
80 (Pwrbk)	GO 120	17	1900	150000	12	$349		
Digital Equipment								
1.05GB	DSP-3105	9.5	2600	250000	60	$1,249	$1,299	$1,349
Seagate								
240 (PowerBook)	ST-9295N	16	2100	150000	12	$549		
1.05GB	ST-11200N	10.5	3200	200000	60	$999	$1,049	$1,099
Fujitsu								
520MB	M2624FA	9	2700	200000	60	$799	$859	$899
1.06GB	M2694FA	9	2800	200000	60	$1,399	$1,449	$1,499

Spin, and the Spin tornado are trademarks of Spin Peripherals, Inc. All other trademarks are the property of their respective holders. Prices are subject to change without notice.

MWK510

66-1200

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*If order is placed by 1 p.m. PDST.

If you are happy with your purchase, tell a friend. If you're not, let us know!

MAGNETO-OPTICAL

TEAC

Model	Speed	Size	External
128mb	45ms	3.5"HH	$979
128mb cartridges (Tosoh)			$39

FUJITSU

Model	Speed	Size	External
128mb	35ms	3.5"HH	$999

RICOH

Model	Speed	Size	External
128mb	45ms	3.5"HH	$1039
650mb	28ms	5.25"FH	$2299
128mb/650mb Cartridge			$39/99

Maxtor®

Model	Speed	Size	External
Tahiti IIM	35ms	1.0gb	$3095
1.0gb Optical Glass Cartridge			$225

All MO drives come with FWB HDT software, one MO cartridge and have a ONE year Warranty.

TAPE BACK-UP

ARCHIVE

SPECIAL! 2.0gb DAT – $999 –

Model	External
2.0gb Standard	$999
4.0gb - 8.0gb Compression Turbo	$1399
90m /60m Tape	$19/$16

TEAC

Model	External
150mb Tape Backup Drive	$469
600mb Tape Backup Drive	$669
600mb / 150mb Tape Cassette	$25/$20

All tape backup drives come bundled with FREE Retrospect V.2.0, one tape and have a ONE year warranty.

SyQuest

SPECIAL! *Syquest external 105mb drives* **$725**

All Syquest 44/88 cartridges are bundled with DIVA VideoShop *– a $599 value –* **FREE!** until 5/15/93

Model	
External SyQuest 44mb (One Cartridge Inc.)	$385
External SyQuest 88mb (One Cartridge Inc.)	$485
External SyQuest 88mb C* (One Cartridge Inc.)	$585
External SyQuest 105mb (One Cartridge Inc.) *SPECIAL!*	$725
Internal 44mb SyQuest (for Quadra 900&950)	$345
Internal 88mb SyQuest (for Quadra 900&950)	$465
Internal 88mb C SyQuest (for Quadra 900&950)	$555
External SyQuest Dual 44mb (One Cartridge Inc.)	$695
External SyQuest Dual 88mb (One Cartridge Inc.)	$875
External SyQuest Dual 44/88mb (One 44 & One 88 Cartridge)	$875
External SyQuest Dual 88C mb(One Cartridge Inc.)	$1045
External SyQuest Dual 44/88C mb (One 44 & One 88 Cartridge)	$965
SyQuest 44mb Cartridge/10 Pack	$62.50/$610
SyQuest 88mb Cartridge/5 Pack	$96.50/$475
SyQuest 105mb Cartridge/5 Pack	$75/$370

All SyQuest Drives come with FWB™ HDT Formatting Software. SyQuest carries a TWO year Warranty on Drives and ONE year on Cartridges. *READS AND WRITES 44 AND 88 CARTRIDGES. Does not format 44 cartridges.

TOSHIBA

Formatted Capacity	Speed	Size	Internal	External
877mb	12.5ms	3.5"HH	$999	$1059
1.23gb	12.5ms	3.5"HH	$1239	$1299
213mb	12ms	2.5"PB	$545	$645
CD-ROM				
600mb *NEW!*	200ms	3.5"HH	$469	$499

Dual Speed/Photo-CD/Multisession compatible

Toshiba carries a THREE year Warranty on drives. ONE year Warranty on CD Rom. FWB CD Rom Tool Kit Formatting Software Included.

Quantum

"An Apple Authorized Brand"

Formatted Capacity	Speed	Size	Internal	External
ELS 42mb	19ms	3.5"TH	$169	$229
ELS 85mb	17ms	3.5"TH	$195	$255
ELS 127mb	17ms	3.5"TH	$229	$289
ELS 170mb	17ms	3.5"TH	$259	$319
LPS 240mb	10ms	3.5"TH	$339	$399
LPS 525mb	10ms	3.5"TH	$869	$929
Pro 700mb	10ms	3.5"HH	$1139	$1199
Pro 1.05gb	10ms	3.5"HH	$1269	$1329
Pro 1.22gb	10ms	3.5"HH	$1399	$1459
GRS•80mb	16ms	2.5"PB	$289	$389
GO•120mb	16ms	2.5"PB	$339	$439

TWO year Warranty. ONE year Warranty on GO drives. FWB™ HDT Formatting Software Included.

HARD DRIVES

FUJITSU

SPECIAL! Fujitsu 520mb Int. – $789 –

Formatted Capacity	Speed	Size	Internal	External
513mb *SPECIAL!*	9ms	3.5"HH	$789	$849
1.0gb	9ms	3.5"HH	$1535	$1595
1.03gb	15ms	5.25"FH	$1245	$1345
1.65gb	15ms	5.25"FH	$2245	$2345
2.05gb	12ms	5.25"FH	$2445	$2545

FIVE year Warranty. FWB™ HDT Formatting Software Included.

CONNER

"An Apple Authorized Brand"

Formatted Capacity	Speed	Size	Internal	External
82mb	17ms	3.5"TH	$189	$249
160mb	13ms	3.5"TH	$255	$315
206mb	12ms	3.5"TH	$339	$399
515mb	10ms	3.5"HH	$859	$919

TWO year Warranty. FWB™ HDT Formatting Software Included.

MICROPOLIS

"Novell Certified"

Formatted Capacity	Speed	Size	Internal	External
698mb	10ms	3.5"HH	$1235	$1295
1.05gb	10ms	3.5"HH	$1335	$1395
2.1gb	12ms	5.25"FH	$2695	$2795

FIVE year Warranty. FWB™ HDT Formatting Software Included.

Maxtor®

SPECIAL! 1.15gb 3.5"HH 6300RPM – $1439 –

Formatted Capacity	Speed	Size	Internal	External
120mb	15ms	3.5"TH	$209	$269
203mb	15ms	3.5"TH	$299	$359
325mb	15ms	3.5"HH	$569	$629
520mb /6300 RPM	9ms	3.5"HH	$899	$959
1.15gb/6300 RPM	9ms	3.5"HH	$1439	$1499
1.0gb	13ms	5.25"FH	$1199	$1299
1.43gb	13ms	5.25"FH	$1449	$1549

ONE and TWO year Warranty on 3.5" Drives and TWO Years on 5.25" Drives. FWB™ HDT Formatting Software Included.

MAC INVENTORY BLOWOUT!

•IIvx 4/80	$1449
•IIvx 4/230	$1699
•IIvx 5/80 with CD	$1899

All Macs are brand new and have a ONE year warranty. Prices good while supplies last.

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Powerbook 145 4/40 – 4/80	$2049/$2389
Powerbook 160 4/40 – 4/80 – 4/120	$2319/$2659/$2999
Powerbook 180 4/80 – 4/120	$3919/$4269
Powerbook 165 Color 4/80 – 4/120	$3239/$3589
Classic Color 4/80 *SPECIAL!*	$1349
LC III 4/80 – 4/160	$1289/$1429
IIVX 4/80 – 4/230 – 5/80 w/CD-Rom	$1449/$1699/$1899
Centris 610 4/80 w/o Ethernet	$1679
Centris 650 4/80 w/o Ethernet	$2449
Centris 650 8/80 with Ethernet	$2899
Quadra 950 8/0	$4669
Quadra 800 8/230 – 8/500	$4029/$4669
Apple Adjustable Keyboard	$215
Apple 14"/16" Color Monitor	$529/$1279
StyleWriter II	$339
Apple LaserWriter Pro 600/630	$1999/$2419
Apple Color Printer	$2239

POWERBOOK/DUO ACCESSORIES

Powerbooks:	
PowerBook Cables (HDI 30-25 or 50)	$35
Radius PowerView	$489
External Battery Recharger for PowerBook	$149
PowerBook Battery	$79
PowerPad-Sophisticated Circuits	$79
Auto Power Adapter/Empire Engineering	$89
GCC WriteMove II Printer	$499
AE AxCell (Cellular Phone Interface)	$270
AE DataLink PB	$473
AE Powerbook Auto Adapter	$66
E-Mach PowerLink Presenter	$479
Duos:	
Duo Floppy Adapter	$135
HDI-20 Ext. 1.44mb Floppy Drive	$199
Duo A/C Adapter	$69
Duo Rechargable Battery	$69
Duo Dock	$975
Apple Mouse II	$79
Carrying Cases:	
I/O Design Ultimate SL/EX - nylon	$69/$79

For memory see Macintosh SIMMS section on next page, and for 2.5" drives see Quantum and Toshiba section above.

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- *Should your product not be perfect, we offer toll-free tech support at 800-392-5818.*
- *There is no surcharge on any credit card purchase.*

NEC

MultiSync 3FGx – 15" Monitor	$615
MultiSync 4FG – 15" Monitor	$735
MultiSync 5FGe ***NEW!*** – 17" Monitor	$1145
MultiSync 5FG – 17" Monitor	$1305
MultiSync 6FG – 21" Monitor	$2355
FG8x 8-bit board	$645
FG24x 24-bit board	$1205
FG24xp 24-bit board	$505
CD-Express	$355
CD-ROM CDR-74	$625
Multi-Media Gallery	$805
SilentWriter 95F Printer	$1299
SilentWriter 95FX Printer	$1539
SilentWriter 97F Printer	$1579
SilentWriter 97FX Printer	$1819
ColorMate PS-40 Color Printer	$3499
2mb upgrade for printers	$95

NEC MultiSync 5FG Monitor
- 17" Multi-Frequency Color Monitor
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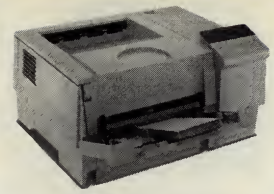
- Up to 1024x768 resolution

MacUser August 1992 — **$1305**



NEC SilentWriter Model 95f Laser Printer
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- Envelope feeder and cassette included
- 6ppm/300dpi/2mb RAM

MacUser September 1992 — **$1299**

NEC CDR-74 CD-ROM Reader
- 280ms access time
- Photo-CD/Multisession compatible
- 2-year warranty

MacUser March1993 — **$625**

*– Get a **$100 rebate** from NEC when you purchase a MacFG 24Xp card with either a 15" or 17" MultiSync FG monitor. Offer ends 6/30/93 –*

VIDEO

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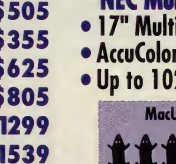

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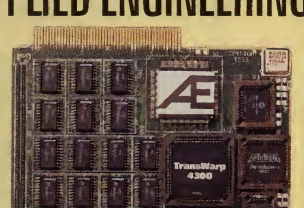

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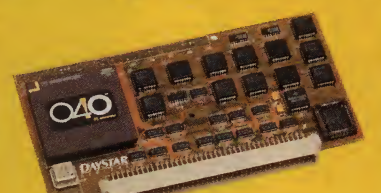

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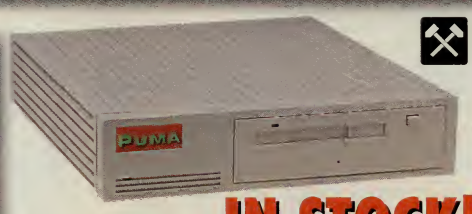

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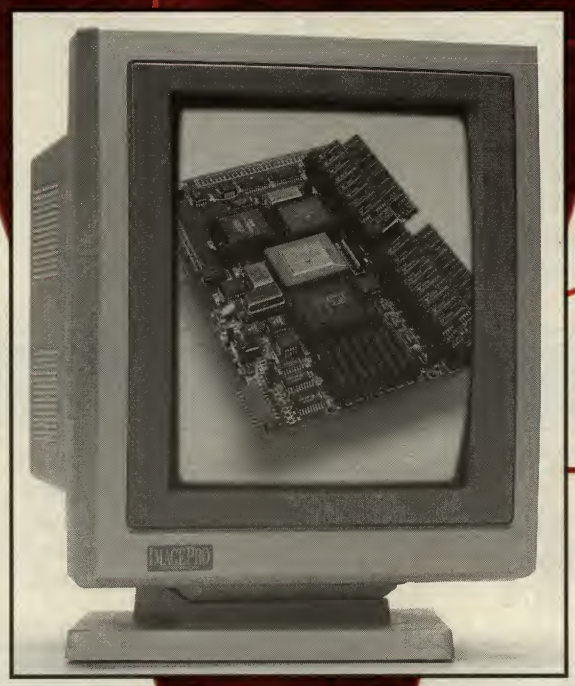

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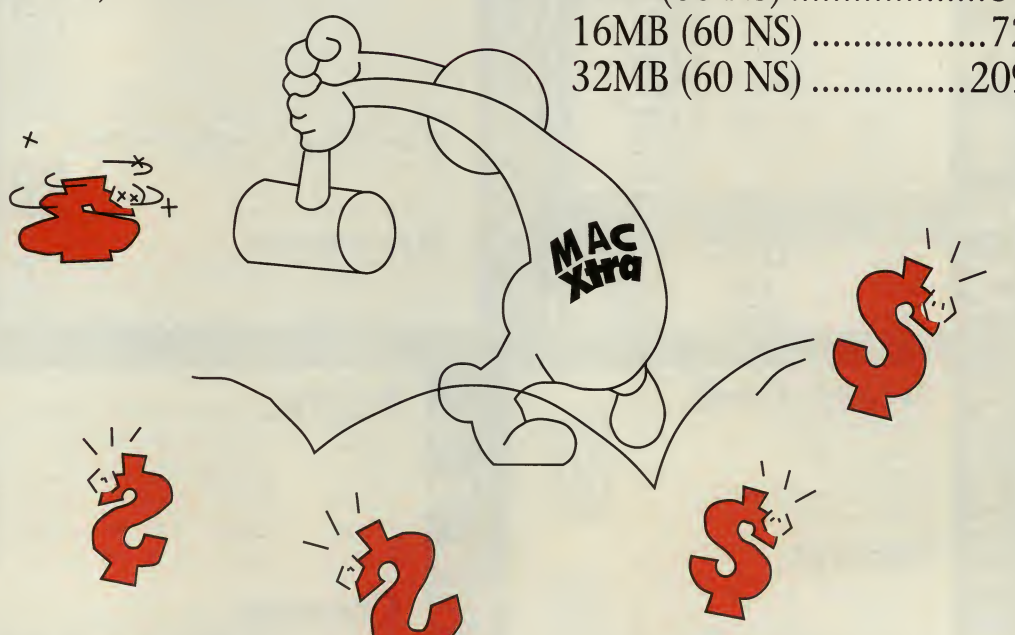

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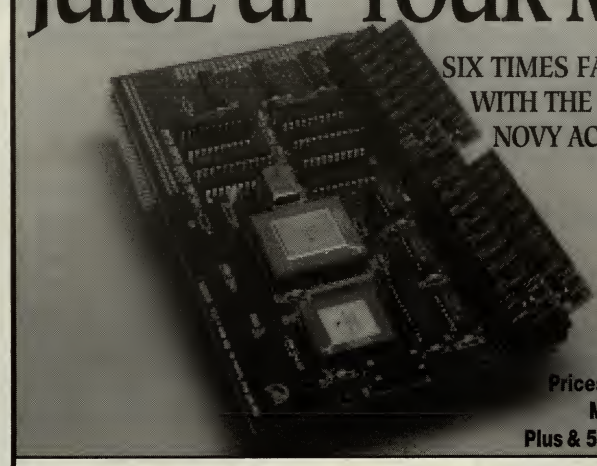

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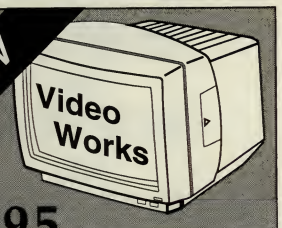

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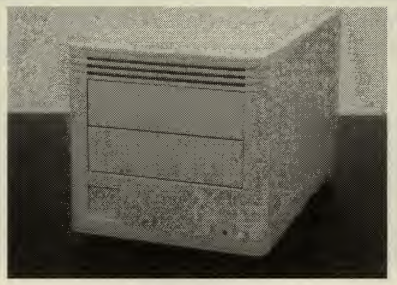

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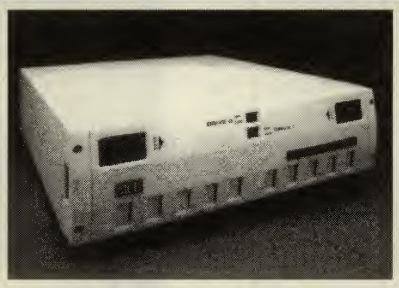

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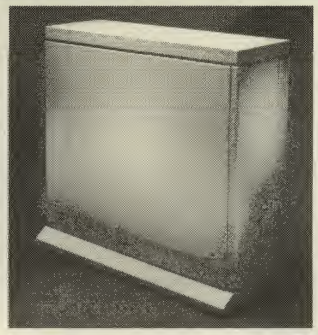

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540	ST3600N	1"	10.5	$ 855	$ 955
665	ST4767N	FH	12	$1025	$1125
*860	ST1980N	3.5	9.9	$977	$1077
1037	ST41200N	FH	16	$1047	$1147
*1037	ST11200N	3.5	10.5	$1020	$1115
1420	ST41650N	FH	15	$1228	$1348
1420	ST41600N	FH	11.5	$1695	$1815
*1900	ST42100N	FH	12.9	$1580	$1700
*2100	ST42400N	FH	11	$2217	$2337
*2900	ST43400N	FH	11	$2808	$2928

SPECIALS

TYPE	MB	SIZE	SEEK	INT.	EXT.
Fujitsu	520	3.5"	12	$ 765	$ 865
Seagate	1.04GB	3.5"	10	$1020	$1115
Fujitsu"Optical"	128	3.5"	30	$1020	$1130
Seagate	1900	FH	12	$1580	$1700

CD-ROM CHINON

CDS-535 INTERNAL KIT 650MB 280MS $ 450

"PHOTO CD COMPATIBLE"

MAXTOR
2 YEAR WARRANTY

MB	TYPE	SIZE	SEEK	INT.	EXT.
213	7213SY	1	15	$ 296	$ 391
340	LXT340SY	3.5	13	$ 557	$ 652
540	LXT540SY	3.5	8.5	$ 899	$995
1240	1240S	3.5	8.5	$1322	$1417
1059	P0-12S	FH	13	$1045	$1165
1345	P1-17S	FH	13	$1265	$1385

QUANTUM
2 YEAR WARRANTY

MB	TYPE	SIZE	SEEK	INT.	EXT
240	LPS240S	1"	16	$ 328	$ 428
525	LPS525S	1"	10	$ 750	$ 850
700	PD700S	1"	10	$1155	$1255
1050	PD1050S	3.5	10	$1205	$1300
1200	PD122S	3.5	10	$1360	$1455

CONNER
1 YEAR WARRANTY

MB	TYPE	SIZE	SEEK	INT.	EXT
170	30170	1"	17	$ 260	$ 360
212	30200	1"	12	$ 333	$ 430
545	30540	1"	10	$ 872	$ 972

- **Immediate Delivery: we have a 92% rate of shipping within 24 hours. Overnight delivery available.**
- **Product knowledge: our sales people and technicians will provide the most cost effective drive or subsystem solution.**
- **Technical assistance: toll FREE service Monday thru Friday, 9am to 6pm EST.**
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•Unformatted Capacity	•Model	• Form Factor	•(ms) •Int.		•Ext.
FUJITSU					
520MB	M2624FA	3.5 HH	9	$799	$859
1.1GB	M2694SA	3.5 HH	8.5	$1529	$1589
1.2GB	M2266SA	5.25 FH	14.5	$1245	$1345
2.0GB	M2652SA	5.25 FH	14.5	$2199	$2299
2.4GB	M2654SA	5.25 FH	14.5	$2399	$2499
• Five year warranty					
QUANTUM					
42MB	ELS42	3.5 1"	19	$169	$229
85MB	ELS85	3.5 1"	17	$195	$249
127MB	ELS127	3.5 1"	17	$229	$285
170MB	ELS170	3.5 1"	17	$259	$309
240MB	LPS240	3.5 1"	10	$339	$395
525MB	LPS525	3.5 1"	10	$869	$929
700MB	PRO700	3.5 HH	10	$1129	$1189
1.0GB	PRO1050	3.5 HH	10	$1249	$1309
1.2GB	PRO1225	3.5 HH	10	$1399	$1459
80MB	Go•Drive	2.5	17	$289	$379
120MB	Go•Drive	2.5	17	$329	$419
• ELS, LPS, PRO drives have two year warranty					
• GO•drives have one year warranty					
SYQUEST				Single	Dual
44MB	IMS 44MB External			$389	$729
88MB	IMS 88MB External			$489	$899
88MB	IMS 88c External	*NEW!*		$589	
44MB	SyQuest SQ400 Cartridge			$64	
88MB	SyQuest SQ800 Cartridge			$99	
• Drives ship with one cartridge					
• Drives have two year warranty					
MAXTOR					
120MB	7120	3.5 1"	15	$215	$280
207MB	7213	3.5 1"	15	$309	$369
330MB	LXT-340	3.5 HH	15	$569	$629
540MB	MXT540SL	3.5 HH	8.5	$899	$959
1.2GB	MXT1240S	3.5 HH	8.5	$1429	$1489
1.2GB	PO-12S	5.25 FH	13	$1149	$1249
1.7GB	P1-17S	5.25 FH	13	$1399	$1499
• 3.5" drives have one year warranty					
• 5.25" drives have two year warranty					
SEAGATE					
1.2GB	ST11200N	3.5 HH	10.5	$1199	$1259
2.1GB	ST42100N	5.25 FH	12.9	$1749	$1849
1.6GB	ST41600N	5.25 FH	11.5	$1839	$1939
2.4GB	ST42400N	5.25 FH	11	$2449	$2549
3.4GB	ST43400N	5.25 FH	11	$3299	$3399
• Drives have one year warranty					
MICROPOLIS					
660MB	1624	5.25 HH	14.5	$1269	$1395
1.0GB	2112	3.5 HH	10	$1689	$1749
2.0GB	1924	5.25 FH	10	$2849	$2949
• Drives have five year warranty					

5 YEAR WARRANTY

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for PowerBook 160, 180 and Duo computers $739

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for Mac Plus, Classic, Classic II, SE, SE/30 & PowerBook computers $619

• Call for information about other Sigma Designs products.

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Full Height	*$145*
Half Height	*$85*
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- Full Height cabinet will hold two 3.5" or 5.25" HH drives.

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PowerBook Cable	
HDI-30 ~ 50 Centronics	$39
Power Pad (keypad)	$89
PowerBook Memory	(Call)
PowerBook Battery for 140/145/160/170/180	$65
Battery Charger	$99

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"Super performance for ALL software applications." Accelerates everything your computer does. From QuickDraw screen refreshes to spell-checking your documents, the PowerCache turbocharges your computer, transparently."

Classic, Color Classic, SE, SE/30, LC, LC II, II, IIx, IIcx, IIci, IIsi, IIvi, IIvx, Performa 400 and 600 - adapter required for all but the IIci, IIvi, IIvx, and Performa 600.

PowerCache		w/FPU
33MHz	$375	$459
40MHz	$545	$635
50MHz	$715	$845
PowerCache Adapter	$41	

FastCache		
Turbo (128k)	$169	
Quadra 700/900	$249	
Quadra 700/800/900/950	$375	
IIsi (64k)	$279	$349
IIci (64k)	$199	

Disk Runner - NEW!!!
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Turbo 040 Accelerators

Turbo 040	25MHz	$1079
Turbo 040	33MHz	$1329

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6" x 8" ArtZ ADB Tablet	$309
6" x 9" Standard	$462
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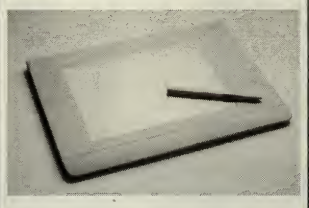
12" x 18" Standard	$990
12" x 18" Electrostatic	$1059



ArtZ tablet w/pressure pen. Works with all Macintosh software applications and is supported by all major pressure-sensitive software applications.

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600MB	5.25"	**$99**
128MB	3.5"	**$40**

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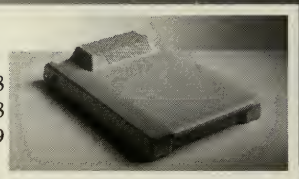
Accelerators

for Mac LC, LCIII, Performa 400, & Color Classic					
TransWarp	4300	40MHz	$369	w/FPU	$505
for Mac SE & SE/30					
TransWarp	1300	25MHz	$185		
TransWarp	1300	40MHz	$249	w/FPU	$409
for Mac Classic					
TransWarp	2300	25MHz	$185		
TransWarp	2300	40MHz	$249	w/FPU	$340

UMAX

Color Scanners

UC630	$1078
UC840	$1248
UC1200	$2999
Transparency Adapter	$709



• UMAX scanners ship with Adobe PhotoShop™ software.

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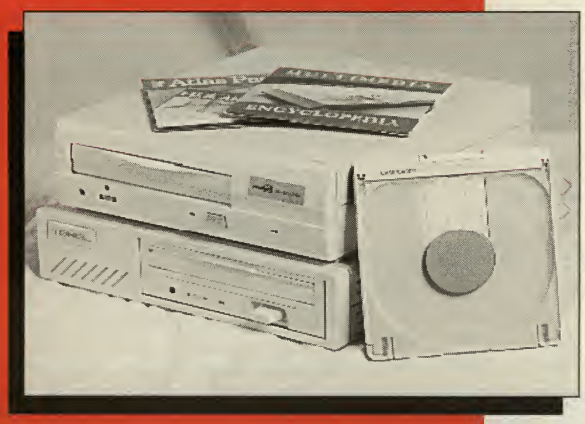
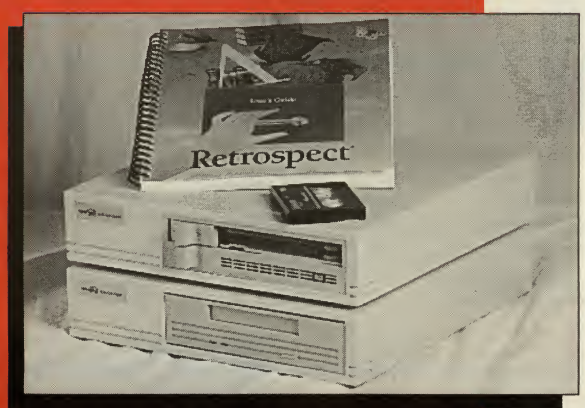
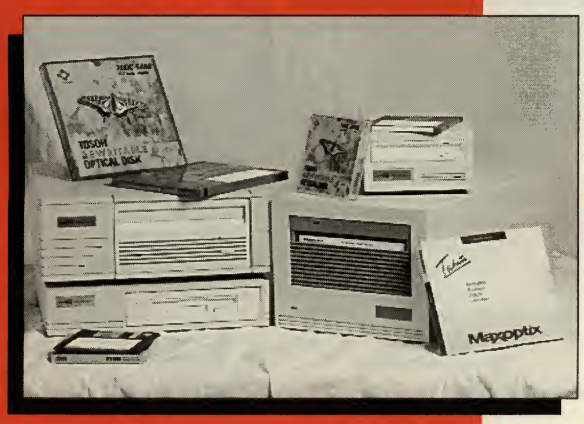
MegaHaus external enclosures feature external ID select, external termination, 2 SCSI connectors, Metal case. SpotOn software features disk caching, password protection, and a wide variety of drive icons.







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Hard Drives

Includes: SpotOn Formatting Software, Cables

Capacity	Speed	RPM	Brand	Warranty		Internal	External
84Meg	17ms	3822	Conner	2 Years		$179	$249
85Meg	17ms	3600	Quantum	2 Years		$195	$275
127Meg	17ms	3600	Quantum	2 Years		$229	$289
130Meg	17ms	3600	Maxtor	2 Years		$209	$269
170Meg	17ms	3600	Conner	2 Years		$265	$345
213Meg	15ms	3600	Maxtor	2 Years		$299	$369
213Meg	12ms	4000	Toshiba	1 Year		$559 (2 1/2" for Powerbook)	
240Meg	16ms	4300	Quantum	2 Years		$335	$399
340Meg	15ms	3600	Maxtor	1 Year		$539	$599
520Meg	12ms	4400	Fujitsu	5 Years		$769	$829
540Meg	8.5ms	6300	Maxtor	2 Years		$929	$999
877Meg	12ms	3600	Toshiba	5 Years		$1059	$1139
1050Meg	10ms	5400	Micropolis	5 Years		$1299	$1359
1080Meg	9.5ms	5400	Fujitsu	5 Years		$1499	$1579
1100Meg	10.5ms	5400	HPackard	5 Years	*Sale!*	**$1259**	**$1299**
1230Meg	12ms	3600	Toshiba	5 Years		$1199	$1269
1200Meg	8.5ms	6300	Maxtor	3 Years		$1349	$1429
2003Meg	11.5ms	5400	HPackard	5 Years		$2549	$2599
2060Meg	12ms	5400	Fujitsu	5 Years		$2275	$2375

We sell the complete lines of all brands shown. We have Disk Array Systems for incredible performance and fault tolerance.

Syquest Drives

Includes: SpotOn Formatting Software, 1 Cartridge, Cables

Capacity	Model	Speed	Internal	External
44Meg	SQ555	20ms	$349	$379
88Meg	SQ5110	20ms	$419	$459
88Meg	SQ5110C	20ms	$499	$549

Media	44Meg	44Meg5pack	88Meg	88Meg5pack	105Meg	105Meg 5 pack
	$64	$315	$96	***Sale! $449***	$98	$449

CD-ROM Drives

Includes: Trantor Driver Software with Music play software, cables, 1 year warrranty. All CD Drives are Kodak multisession Photo CD Compatible.

Brand	Speed	Transfer	Type	Internal	External
Texel	265ms	300KB/sec	Single Disk	$449	$509
Toshiba	200ms	330KB/sec	Single Disk	$499	$569
Toshiba	200ms	330KB/sec	Battery Powered	N/A	$729
Pioneer*	380ms	150KB/sec	6 Disk Changer	N/A	$899
Pioneer	270ms	612KB/sec	6 Disk Changer	N/A	$1289

CD's (sold only with CD Drive)	Encyclopedia	World Atlas	Us History	Family Doctor	GuinessRecords	Speakers	Caddies
	$55	$22	$35	$72	$45	$90	$9

Tape Drives

Includes: Retrospect Backup Software Ver. 2.0, 1 Tape, Cables, and a 1 year warranty

Capacity	Type	Brand	Speed		Internal	External
250Meg	QIC 150	Archive	7MB/min		$459	$499
2Gig	DAT	Archive	11MB/min		$1029	$1069
2Gig	DAT	Hewlett Packard	12MB/min		$1199	$1269
4-8Gig	DAT	Archive	88MB/min		$1299	$1339
4-8Gig	DAT	HewlettPackard	42MB/min	*Sale!*	**$1329**	**$1379**

We have Hewlett Packard and Archive DAT Autoloaders for large backup.

Tapes DC6250	6250 5 pack	90 Meter DAT	DAT 5 pack	DAT Cleaning Tape
$29	$135	$17	$75	$19

Optical Drives

Includes: SpotOn Formatting Software, 1 Media, and Cables

Capacity	Speed	Brand	Feature	Internal	External
20Meg	65ms	Insite	Floptical	$319	$359
128Meg	30ms	Fujitsu	Fastest 128Meg	$949	$999
650Meg	53ms	Pioneer	MultiFunction	$2059	$2099
650Meg	27ms	Hewlett Packard	MultiFunction	***Super Sale!***	**$2229**
1Gig	35ms	Maxoptix Tahiti IIM	MultiFunction	N/A	$2999

Media	20Meg	20Meg 5 pack	128Meg	128Meg 5 pack	650Meg	650Meg 5 pack	1Gig	1 Gig 5 pack
	$23	$95	$39	$189	$96	$469	$189	$929

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Returns must be in new condition.
*DRM-600 is not Photo CD Compatible

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SyQuest Removable Drives

Mobile 44 - SQ555	378
Mobile 88 - SQ5110	479
Mobile 88+ - SQ5110C	555
Mobile 105 - SQ	745

SyQuest Cartridges:	1 to 4	5 +
SqQuest 44 Meg.	63	61
SqQuest 88 Meg.	97	94
SqQuest 105 Meg.	79	78

*Diva Video Shop Plus Megs of Quick-Time Movies *Free* On Every 44 Cartridge!!*

Rewritable Optical Drives

$1,599 600 Meg. ISO Optical

- Industry Standard - ISO Certified
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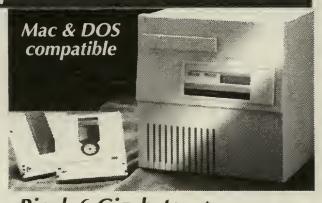
- Low Cost - High Performance

600 Meg. Optimem ISO Model 750	1,599
Premium Quality at Low Cost - 60 ms. access. While Supplies Last - Limited Quantity!	
600 Meg. Ricoh ISO 5031E New!	2,499
High performance - 35 ms. average access.	
1.0 Gig. Maxoptix Tahiti-II	3,199
High capacity - 1 Gigabyte - 35 ms. average access.	
600 Meg. Pioneer MultiFunction	2,199
Rewritable and WORM in one unit.	
600 Meg. Pioneer WORM	1,799
Premium quality, best selling WORM	
128 Meg. Ricoh ISO	1,099
128 Meg. Epson ISO	1,049
128 Meg. Diablo - Panasonic	979
Mac, IBM, Sony Compatible! Fast, too!	

All rewritable optical come with media, software & cables.

Media:	1 to 4	5 +
600M 5-1/4" Optical Plastic	99	95
600M 5-1/4" Optical P 5-Pk	475	460
600M 5-1/4" Optical Glass	169	159
1.0G Glass, Maxoptix	239	229
600M Multifunction	179	169
600M WORM, Pioneer	109	99



Ricoh 6 Gigabyte Optical JukeBox $6,999

*Each 6 Gig. JukeBox contains 10 Optical Cartridges and a Ricoh HyperSpace Erasable Optical Drive. The **IDE JukeBox** (shown) is designed for networks or large on-line storage needs. The **JukeBox** can address all cartridges in a matter of seconds, automatically .*

The JukeBox comes complete and includes:

- Ricoh HyperSpace Optical Drive
- Formatting and Library Software
- 10 Optical Cartridges
- Cables
- Terminator (with Term. Power LED)

DOS Solution Includes:

- All the above plus a Host Adapter

6 Gig. Ricoh/IDE JukeBox	6,999
10 Pak Optical Cartridges	999

Verbatim

Verbatim Media:	1 to 4	5 +
128 Meg. 3-1/2" Optical	44	39
128 Meg. 3-1/2" 5-Pk	195	175
600 Meg. 5-1/4" Plastic	109	105
600 Meg. 5-1/4" P 5-Pk	495	475

Macintosh CD-ROM Players

$599 Kodak Multisession Compatible

Toshiba CD-ROM - XM3401B . 599
***Multisession Toshiba XM3401B. Fast 200 milliseconds average access.** Full audio control via software is provided by the **Music Box** software. Includes sample CD.*

Texel Multisession CD-ROM ... 499
***Texel DM3024.** This is a performance drive with 235 ms average access and double the normal speed - 300 KBytes/sec. data transfer. Kodak Photo-CD compatible!*

CD-ROM by NEC Mesa Portable 299
***New!** Manufactured for Relax by NEC, the **Mesa** is a fast, portable and fully functional CD-ROM player for music and data.*

Chinon 399
Single Session. 150 KBytes/sec. data transfer.

Muti-Disk:
Pioneer 6-Disc DRM-600A . 899
DRM-600X *(600K/Sec. Transfer Rate)* **1,299**
*More than 3 Gig of Data On-Line! Compatible with SUN, IBM and Macintosh. Can even be used as a CD-Audio jukebox! Full audio control via software is provided by the **Music Box** software . Includes SCSI cable, Mac software, and sample CD-ROM.*

PostScript Printers

Sharp 600 dpi Printer $1,199

Grayscale:

Sharp 1,199
600 dpi Engine, 8 ppm, RISC Processor, AppleTalk on-board. Scalable typefaces (PostScript and PCL5) generating thousands of fonts. Printer emulations include Hewlett Packard, IBM ProPrinter & Epson. Parallel and serial interface with automatic sensing. 2 MB RAM (expandable to 8MB).

Color:

Océ G5241 1,999
The Océ G5241 puts the power of color PostScript® printing on your desktop using a true Adobe® PostScript interpreter. Using the thermal transfer method, the G5241 prints either 3 or 4 color on letter or A3 size, paper or overhead transparencies at 300 dpi.

Océ G5232 2,999
The Océ G5232 has all the great qualities of the G5241 but increases the printing capability to tabloid size pages at 300 dpi. True PostScript®, 35 Adobe fonts in ROM, downloadable fonts supported. 8Mb Ram, 20Mb hard drive.

Modems

SupraFAX Modem v.32bis 14,400 299
14,400 bps Modem/14,400 send-receive FAX. v.42bis compression for up to 57,600 bps data.

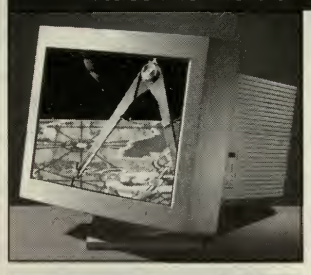
SupraFAX Modem Plus 2,400 199
2,400 bps Modem/9,600 send-receive FAX. v.42bis data compression for up to 9,600 bps data.
All SupraFAX modems include STF and MicroPhone software, cable and have a 5-year Warranty

U.S. Robotics Sportster 14,400 249
Now your Mac can be a fax and a data modem, too, and with U.S. Robotics reliability built in. 14,400 CCITT V.32 bis with V.42 bis– 14,400 bps throughput, com-patible with 300, 1200, 2400, and 9600 bps CCITT standards, 9,600 bps send and receive Group III Fax, V.42/MNP 2-4 error control and V.42 bis/MNP 5 data compression.

Quicktel v.32bis 14,400 269
14,400 bps Modem/14,400 send-receive FAX. v.42bis compression for up to 57,600 bps data.

Quicktel 2400/9600 FAX/Modem 139
2,400 bps Modem/9,600 send-receive FAX. v.42bis compression for up to 9,600 bps data. Incl. software.

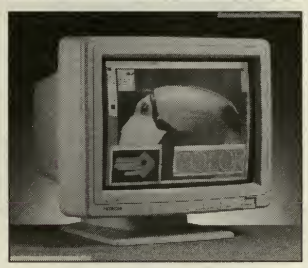
Video Monitors & Packages



20 Inch Color Trinitron! $1,599

Monitor Only	1,599
Business Package* 256 Color	1,799
Artist Package* 16 Million Color	2,449

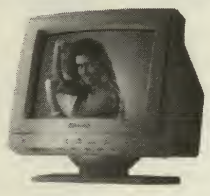
** Package includes a new 20" Relax Mac compatible Trinitron color monitor, video board, and cable. 72 dpi for WYSIWYG.*



20 Inch Hitachi 256 Color Monitor! $799

Monitor Only	799
Business Package* 256 Color	999
Artist Package* 16 Million Color	1,649

** Package includes a new 20" Hitachi Mac compatible color monitor, video board, and cable. 72 dpi for WYSIWYG.*



14 Inch 256 Color Monitor! $359

Monitor Only	359
8 - Bit Package 256 Color	499

Compatible with Macintosh On-Board Video- LC, LCII, si, ci and Quadra 900/950.

Grayscale:

Sampo Monitor Only	599
Mac II, x, fx, cx, ci Package *	799
Mac LC, LCII, SE/30 Package*	999
Ikegami Monitor Only	799
Mac II, x, fx, cx, ci Package *	999
Mac LC, LCII, SE/30 Package*	1,199

** Package includes a new 20" Mac compatible grayscale monitor, video board, and cable. 72 dpi for WYSIWYG.*

20 Inch Sampo 256 Grayscale Monitor! $599

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Editing Aces	3,499	24XLi	1,889
24STV - Multi Media	769	PaintBoard 24	1,449
MoviePak	1,499	PaintBoard Li	849
24XLTV Multi Media	2,639	8XL	499
24MxTV Multi Media	1,649	ClearVue/Classic	299
MediaTime Multi M.	1,499	ClearVue/LC	299
ProColor 32	3,149	Sweet 16" Monitor	1,249

Ethernet / Network

Asanté MacCon3 - 64K	189
Asanté MacCon+ - 64K	149
Asanté FriendlyNet Adapters	69
Asanté 10BaseT Hub/8	239
Asanté 10BaseT Hub/12	479
AsantéHub 1012	1,379
Asanté Print	34

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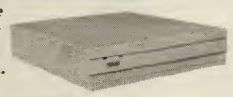
TechWorks Ethernet Cards.. 99
We made a special purchase of TechWorks Ethernet NuBus cards- ThinNet or 10BaseT. Limited to supply on-hand.

Case Kits

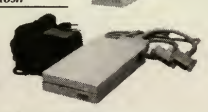
Cases are Made by Relax In the U.S.A.



Half Height ..3.5" or 5.25"	89
Half Height..with front cut out	89
With 35 watt power supply, prw cable, fan, SCSI ID.	
Full Height for 5.25" Drive with front cut out	119
With 55 watt power supply, prw cable, fan, SCSI ID.	

Sierra 3.25" 89
Includes SCSI cable, SCSI ID & Power Supply For PowerBook or any Macintosh

Portable Case Kit for PowerBook or any Macintosh



Includes SCSI cable & power supply

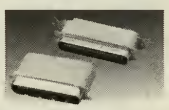
Pocket 3.25" Low Profile	89
Pocket 2.5" Low Profile	89

Cables/Terminators

Hi-Quality Molded SCSI Cables

2' AppleDB25 to Cent.50M	9
2' Cent.50M to Cent.50M	19
6' Cent.50M to Cent.50M	29

TermiGard LED Termination Power Indicators The Best you can buy!



Standard Single Ended Cent50	9
Active Single Ended Cent50	29

Macintosh Video Cables for On-Board Video or Most Monitor Brands

Mac 15 pin to RGB	39
Quadra/Centra 16" or 21"	49

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Seagate *3-1/2" Half Height*

	Internal	External
510 Meg. - ST1581N, 14 ms.	939	999
1.0 Gig. - ST11200N, 14 ms.	1,149	1,209
5-1/4" Full Height - WREN		
1.0 Gig. - ST41200N, 15 ms.	1,149	1,249
1.4 Gig. - ST41651N, 15 ms.	1,349	1,449
1.9 Gig. - ST42100N, 12.9 ms.	1,725	1,825
5-1/4" Full Height - ELITE Ultra-High Performance		
1.4 Gig. - ELITE-I, 11.5 ms.	1,825	1,925
2.1 Gig. - ELITE-II, 11 ms.	2,449	2,549
3.5 Gig. - ELITE-III, 11 ms.	3,149	3,249

Fujitsu *3-1/2" Half Height*

520 Meg. - 2624FA, 9 ms.	799	899
1.2 Gig. - 2694SA, 8.5 ms.	1,545	1,605
5-1/4" Full Height		
1.2 Gig. - 2266SA, 11.5 ms	1,245	1,345
2.0 Gig. - 2652SA, 11.5 ms	2,245	2,345

Maxtor *3-1/2" Low Profile/Low Power*

120 Meg. - 7120S, 15 ms.	209	269
213 Meg. - 7213S, 15 ms.	299	359
5-1/4" Full Height		
645 Meg. - XT8760S, 16.5 ms.	949	1,099
1.7 Gig. - Panther, 13 ms.	1,449	1,549

NEW! Hitachi 3.5 Gig. $2,999
12.8 ms av. access DK-517C-37 External Model $3,099

	Internal	External
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1.4 Gig. - DK-315C-14, 11.8 ms.	1,399	1,459
5-1/4" Full Height		
3.5 Gig. - DK-517C-37, 12.8 ms.	2,999	3,099

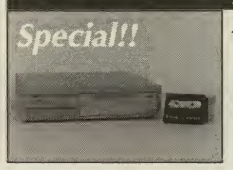
Conner *3-1/2" Half Height*

	Internal	External
42 Meg. - CP-3040, 25 ms.	179	239
85 Meg. - CP-30080E, 17 ms.	195	255
120 Meg. - CP30100, 19 ms.	259	319
170 Meg. - CP-30170E, 17 ms.	275	335
212 Meg. - CP-30200, 12 ms.	355	415
545 Meg. - CP-30540, 8.5 ms.	895	955

Quantum *3-1/2" ELS Low Profile*

42 Meg. - ELS42, 19 ms.	169	229
85 Meg. - ELS85, 17 ms.	195	255
127 Meg. - ELS127, 17 ms.	229	289
3-1/2" PDS, PRO & LPS Series		
240 Meg. - LPS240, 10 ms.	339	399
525 meg. - LPS525, 10 ms.	869	929
1.0 Gig. - PD1050S, 11 ms.	1,239	1,299
1.2 Gig. - PD1225S, 11 ms.	1,399	1,459
2-1/2" - Internal for the Mac PowerBook only		
80 Meg.- Go•Drive GRS80,17 ms.	289	389
120 Meg.- GRS120, 17 ms.	339	439
160 Meg.- GRS160, 17 ms.	579	679

Teac, DAT and ExaByte Tape Drives



2.0 Gig. Wang DAT Tape
Retrospect software & tape included!
$999

Tape Drives include media, software and cables!

Tape Drives:

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250 Meg. Tape Vista - Archive	599
600 Meg. Tape Vista - TEAC	649

DAT & Exabyte Drives Include media, Cables and Retrospect Software.

DAT 4 mm Drives:

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2.0 Gig. DAT - Hewlett Packard	1,399

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8.0 Gig. DAT - Hewlett Packard	1,549

ExaByte Helical Scan 8 mm Drives:

2.2 Gig. Tape Vista - ExaByte 8200	1,799
5.0 Gig. Tape Vista - ExaByte 8500	2,839

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Mac II, IIx, IIcx, IIci & Quadra:

Classic 3 Meg. Card w/1 Meg.	49
1 Meg.- 1M x 8 - 120, 100, 70 .. 26, 29, 32	
2, 4, 8 Meg. x 8 - 80	59, 119, 279
4 Meg. - 4M x 8 - 70	129

Mac IIfx:

4 Meg. - 4M x 8 - 70 (IIfx)	149
8, 16 Meg. x 8 - 80 (IIfx)	299, 599

Mac Centris, Color Classic, LCIII, Quadra 800

1, 2 Meg. x 32 - 70 (72pin)	129, 259
1, 2 Meg. x 32 - 60 (72pin)	139, 269
4, 8 Meg. x 8 - 70 (72pin)	159, 329
4, 8 Meg. x 8 - 60 (72pin)	189, 369

Video Memory:

Quadra 700/900/950 256K Video SIMM	29

Mac Powerbook:

Powerbook 100 - 4, 6 Meg.	179, 229
Powerbook 140/170 - 4, 6 Meg.	159, 209
Powerbook 160/180 - 6 Meg.	229
PowerBook 160/180 - 8,10 Meg.	349, 449
Powerbook 210/230 - 8, 10 Meg.	399, Call
PowerBook 12-Hour Battery Pack	49

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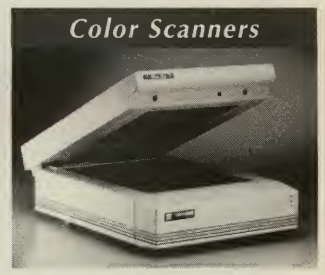

Tamarack 600 Color Scanner:

24-Bit Color - 8.5" x 11.5"	979
Slide Attachment (shown)	549
PhotoShop LE (limited version)*	99
PhotoShop 2.0 (full version)*	199

Relax Color: (Epson Engine)

24-Bit Color Scanner - 8.5" x 11.5"	
300 dpi - 110 VAC	949
300 dpi - 220 VAC	1,099
Color Studio LE (limited version)*	79
Color Studio 1.5 (full version)*	159

Sharp Color Scanner:

JX-320** - 8.5" x 11"	
24-Bit 600 dpi w/PhotoShop	999
Transparency/Slide Attachment	799

Umax Color Scanners:

UC630** - 8.5" x 14"	
24-Bit 600 dpi w/PhotoShop	1,079
Transparency/Slide Attachment	789
Auto Document Feeder	479
UC1200S** - 8.5" x 14"	
24-Bit 1,200 dpi w/PhotoShop	2,999
Transparency/Slide Attachment	889

Relisys Color Scanner:

ColdScan 800 - 8.5" x 14"	
24-Bit 800 dpi	1,099
PhotoShop LE (limited version)*	99
PhotoShop 2.0 (full version)*	199

** with purchase of scanner, ** includes PhotoShop*

660 Meg. WREN Runner	1,149
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127MB 3.5" ELS 17MS	$219/$279
170MB 3.5" ELS 17MS	$245/$305
240MB 3.5" LPS 10MS	$329/$389
1.0GIG 3.5" PRO 10MS	$1229/$1289
1.2GIG 3.5" PRO 10MS	$1379/$1439

FUJITSU

520MB 3.5" 12MS	$739/$799
1.2GIG 5.25" 14MS	$1139/$1199
2.4GIG 5.25" 11MS	$2307/$2407

SEAGATE

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2.4GIG 5.25" 11MS	$2459/$2559
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MICROPOLIS

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88MB Cartridges-Single	$97
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ELS 85 MB	190	250	Pro 425 MB	879	939
ELS 127 MB	225	285	LPS 525 MB	865	925
ELS 170 MB	255	315	Pro 700 MB	1089	1149
GO 120 MB Drive	375	475	Pro 1050 MB	1259	1319
160 MB GRS 2.5"	519	619	Pro 1225 MB 10 MS	1355	1415

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1.2 GB	M2112	3.5" 10 MS, 5 yr. War. Fast SCSI-2	1215	1275
1.5 GB	M1528	5.25" 14 MS, 5 yr. War. Fast SCSI-2	1645	1765
2.0 GB	M1548	5.25" 14 MS, 5 yr. War. Fast SCSI-2	1899	2019
2.4 GB	M1924	5.25" 11 MS, 5 yr. War. Fast SCSI-2	2499	2609
3.5 GB	M1936	5.25" 11 MS, 5 yr. War. Fast SCSI-2	3515	3625

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185 MB	M2614	3.5"	17 MS,3 year Warranty	249	309
330 MB	M2622	3.5"	9 MS, 5 Yr. War. Fast SCSI-2	765	850
520 MB	M2624	3.5"	9 MS, 5 Yr. War. Fast SCSI-2	760	825
1.2 GB	M2694	3.5"	8.5 MS, 5 Yr. War. Fast SCSI-2	1475	1535
1.2 GB	M2266	5.25"	11 MS, 5 Yr. War. Fast SCSI-2	1189	1309
2.06 GB	M2652	5.25"	11 MS, 5 Yr. War. Fast SCSI-2	1925	1935
2.4 GB	M2654	5.25"	11 MS, 5 Yr. War. Fast SCSI-2	2160	2270

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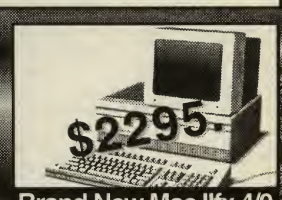

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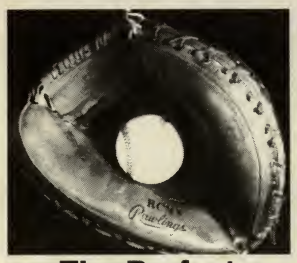

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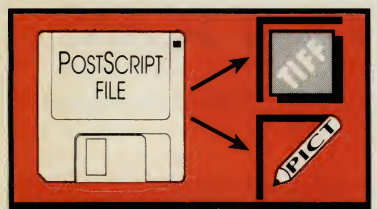

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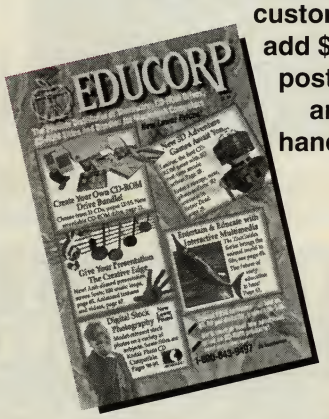

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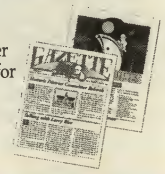

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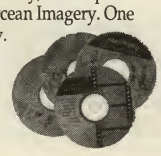

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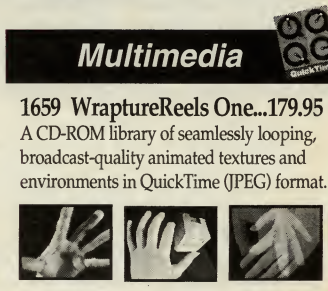

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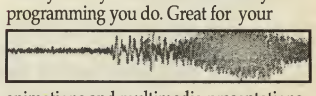

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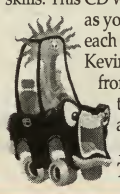

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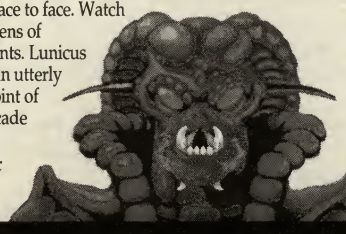

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VITAL

From Page 1

ular products — Apple-labeled or otherwise — to be used in creating VITAL systems. Instead, the TAGs describe the client-centric concepts behind VITAL and detail the distributed network services and infrastructure Apple recommends.

In VITAL, the client software needs to know little or nothing about the back-end services. This "lazy client" approach uses network messaging as the preferred interface between personal computers and services.

Indeed, VITAL systems are defined primarily by sharable, independent (and possibly redundant) services accessed via messages.

In a process analogous to what goes on inside object-oriented programs, VITAL services receive instructions and data in messages, process them, and pass on the results. A central database, called the Repository, holds the information about all available VITAL services and directs messages from clients to services and among services.

Apple claims implementing VITAL decreases overall maintenance costs because services can be revised without affecting each other. In addition, managers can run the services on the most cost-effective platforms. As long as a service can get its messages and respond, its platform, location and development environment don't matter.

In addition to the Repository, the TAGs recommend a systems infrastructure and define three major functional categories into which services fit: Data Access, Data Capture and Desktop Integration.

▸ **The Data Access environment** sustains consistent "warehouses" of data, culled from multiple sources, for clients to query. According to users, supporting Data Access will be the most accessible and attractive first step for companies moving to VITAL from their current brier patches of legacy systems.

▸ **The Data Capture environment** includes many of the most mission-critical components of corporate computing. Despite VITAL's client-server bent, the TAGs declare simple character-based terminal emulation acceptable for data entry "until the next regularly scheduled major human-interface enhancement." In the nearer term, the TAGs require that databases used in the Data Capture environment have SQL interfaces for reporting and querying.

▸ **The Desktop Integration environment** consists of 31 independent services — including electronic mail, authentication, transaction and query submittals, and software license management — available to client programs. Here the all-important Integration Services Manager is the primary link between a client application and the world of VITAL services; it shields the lazy client from application programming interfaces and data-format requirements.

"I was very impressed with VITAL," said beta-tester Randy Thompson, supervisor of applied technology information services at Philip Morris U.S.A. in Richmond, Va., "because I saw it as a rational approach for solving problems today."

The six-volume TAGs are available directly from Apple at (800) 795-1000. Information about VITAL and Apple-certified VITAL trainers is at (800) 767-2775, Ext. 943. □

System integrators to provide VITAL training

Apple has initially qualified four systems integrators to provide VITAL training and consulting services. Starting in July, these integrators will offer on- and off-site training at least once per quarter, according to Jeri Crittenden, director of Enterprise Systems Division strategy and operations at Apple.

The integrators are:

▸ **Bear River Associates Inc.** at P.O. Box 1900, Berkeley, Calif. 94701-1900. Phone (510) 644-9400; fax (510) 644-9778.

▸ **KMPG•ExIS** at 100 Hamilton Ave., Suite 100, Palo Alto, Calif. 94301. Phone (415) 473-1400; fax (415) 473-0155.

▸ **Martin Marietta Corp.'s** Electronics, Information and Missile Group at 116 Inverness Drive E., MP A16106, Englewood, Colo. 80112. Phone (303) 790-3210; fax (303) 790-3734.

▸ **RWD Technologies Inc.** at 10480 Little Patuxent Parkway, Park View Suite 1200, Columbia, Md. 21044-3530. Phone (410) 730-4377; fax (410) 964-0039.

Apple has also established a central toll-free number for general inquiries about VITAL and certified VITAL trainers: (800) 767-2775, extension 943. *— By Stephen Howard*

Arrange

From Page 1

a scope and customizability that current personal information managers lack, as well as a unique system for interchanging data with other applications, according to sources.

Based on a technology called TAIL, or The ASCII Interchange Language, Arrange will be capable of importing and processing data from a variety of sources (see story below). The first version of Arrange will ship with a system extension that will let users bring in information from any application simply by selecting it and pressing a hot key. If the Common Knowledge program is running, the information will be immediately entered into a specified Arrange document; if not, it will be written to disk until the next time the user launches the program.

Arrange holds data, including text and graphics, in units called notes, which are grouped into outline-style files called topics. In preparation for use on future pen-based systems, the program offers a variety of click-and-drag navigational techniques, including a table-of-contents pane on one side of the screen.

Notes can be of many types, each identified by its own icon. As shipped, the package will support unstructured "pencil notes" for free-form text and more structured note types with fields for specific kinds of data, such as people, appointments, reminders and to-dos. But users will be able to create any number of additional note types, which can incorporate fields for numbers, pictures, dates, times and other types of data; data-entry aids include custom pop-up selection menus and an automatic fill-in function, which completes a word as the user types.

Users can create "auto-gathering" topics, which use agent technology to collect and alias notes from all other topics. By creating an auto-gathering People topic, for example, users can set up a single file displaying all People notes, regardless of where they were created.

In addition, the program lets users create any number of custom views for a topic, displaying subsets of the topic's data selected and sorted according to user-defined rules; a calendar view, for example, would let users see all items associated with the first week of February simply by dragging across that period. Arrange also supports customizable tables.

The program will ship with templates, including custom note types and views, for 12 professions, including managers, consultants, researchers and lawyers.

Pricing has not been set, but the company is reportedly aiming for a street price of less than $200.

Common Knowledge Inc. is at 124 University Ave., Palo Alto, Calif. 94301. Phone (415) 325-9900; fax (415) 325-9600. □

TAIL wagging Tesla

Arrange is anything but a dog, sources say, but the upcoming "information environment" from Common Knowledge Inc. is definitely wagged by its TAIL.

The entire program is based on TAIL, or The ASCII Interchange Language, a protocol designed to facilitate the exchange of information among diverse programs.

The technology, which sources said has garnered intense interest from Apple, is product- and platform-neutral, since it relies on the all-but-universal ASCII text standard, yet it includes provisions for preserving advanced features, such as links between items, that are normally lost when data is converted into plain, tab-delimited text files.

One source, citing Microsoft Corp.'s interchange specification for formatted text, described TAIL as "an RTF for PIMs."

In hopes of making TAIL a standard, Common Knowledge reportedly plans to offer its specification and source code to other developers for a nominal fee. By incorporating the code, developers can enable their programs to exchange data with any other TAIL-compatible application.

Common Knowledge, Apple and third-party developers are reportedly considering a variety of applications for TAIL, including drivers capable of intelligent parsing and processing of data such as electronic-mail and even spreadsheet files. *— By Henry Norr*

Cross platform

From Page 1

to help Windows developers port their applications to the Mac and a licensing agreement that will help Insignia Solutions Inc. develop future Windows emulators for the Mac as well as Unix.

The tool kit, Microsoft said, will include a software layer that implements Windows-specific features, such as OLE (Object Linking and Embedding), on the Mac. At the same time, the company said, developers moving Windows software to the Mac will be able to add support for System 7's platform-specific features. Microsoft gave no details about pricing or shipping of the porting tools.

Under the licensing agreement, Microsoft will provide Windows source code and compatibility-testing tools to Insignia. The Mountain View, Calif.-based company already offers a version of its SoftPC emulator that runs on 68040-based Macs, but last week's deal should facilitate development of improved emulators in the future. In particular, sources said, it should allow Insignia to develop a Windows emulator for PowerPC-based Macs that could offer performance rivaling or even exceeding that of Intel-based systems.

In addition, Microsoft is widely rumored to be investigating porting Windows NT to PowerPC, with the help of Apple and possibly IBM Corp. Microsoft had no comment.

Microsoft's agreement with Insignia appears to be in part a response to the official announcement last week of the Windows Application Binary Interface (Wabi) from Sun Microsystems Inc.'s SunSelect division. The software lets Unix-based systems run Windows applications without the use of Microsoft code. SunSelect said it plans to release Wabi within 90 days. Sun plans to ship a version of its Solaris OS for Intel-based PCs this month.

Next year, when Sun is slated to deliver a version of its Solaris OS for the PowerPC, Wabi should also be available in that context, officials said.

Sun could, however, face a legal challenge from Microsoft because Wabi is not an officially licensed implementation of Windows. Sun discussed licensing Windows from Microsoft earlier this year, but the talks broke down, sources said.

SunSelect combined the unveiling with a proposal for the creation of a Public Windows Interface standard, which would bring the Windows API into the public domain. Citing such companies as IBM, Borland International Inc., Corel Corp., Hewlett-Packard Co. and WordPerfect Corp., SunSelect claimed sizable industry support for the plan.

Further blurring old lines, NeXT Computer Inc. will deliver NeXTstep 486, a version of its object-based OS and development environment for Intel-based systems. And Quorum Software Systems Inc. said last week that it expects to release at the end of this year Equal, a software system that makes it possible to run off-the-shelf Mac applications on workstations from Sun and Silicon Graphics Inc.

IBM's PowerPC-based workstations will initially run the new PowerOpen version of its AIX OS, combined with Macintosh Applications Services, an Apple software module that lets the Finder and other Mac applications run under AIX. IBM officials have said they also plan to port OS/2 to PowerPC.

The climax to this process could come around 1995, when Taligent Inc. is expected to ship an OS that will run on all "all popular platforms," including PowerPC and Intel architectures, and probably allow users to run "personalities" that provide compatibility with older operating environments. □

Lisa Picarille contributed to this report.

Premiere

From Page 1

have taken one minute in Premiere 2.0 could take as little as five to 10 seconds in the new version. In addition, the transitions reportedly have been rewritten to improve performance.

- **Hardware-accelerated previews.** The new version will display full-screen previews of movies by taking advantage of hardware accelerator boards from companies such as RasterOps Co., SuperMac Technology Inc., Radius Inc. and New Video Corp.
- **Interface changes.** Users can navigate movies with an on-screen jog/shuttle wheel resembling the devices used in professional video-editing suites. Premiere 2.0 uses a slider.
- **Improved EDLs.** The new version will support complex transitions for users exporting edit-decision lists to high-end post-production systems such as the CMX 3600 and Grass Valley switchers. Page turns, pushes and circular wipes with variable centers can be transferred through EDLs. The current version only translates simple left-right wipes through EDLs.
- **Capture calibration.** Like Avid Technology Inc.'s Media Suite Pro, Premiere will offer a software digital waveform monitor and a vector scope so users can calibrate incoming video signals.

"The first version of Premiere was a toy. Version 2.0 was more impressive. This version seems like it's more and more like working with professional video equipment," said a source familiar with an alpha version of the upgrade.

Version 3.0 will bolster Premiere's position against a vastly improved upcoming version of VideoShop, due this spring from DiVA Corp. of Cambridge, Mass. VideoShop 2.0 will add professional features such as audio mixing, multitrack video effects, built-in titling, scrolling credits and motion control (see MacWEEK, Jan. 25).

VideoShop 2.0 will also shed the program's dependency on HyperCard, allowing it to run as a stand-alone application in a 1.5-Mbyte memory partition. DiVA is also preparing a low-end editing program — code-named Sparrow — aimed at home and education users.

"DiVA's Sparrow will run on an LC III easily, but Premiere is getting so sophisticated, you'd want to use a fast Mac with a lot of RAM," said Christine Perey, communications director at American Multimedia Group in Auburn, Calif. "It sounds like Adobe is targeting people who are using the Mac to make movies that go out to tape." □

Premiere 3.0 features

- Unlimited layers
- Faster transitions and previews
- Full-screen previews with hardware assistance
- Job wheel (replaces slider)
- Improved edit-decision lists

Help desk

From Page 1

Professional users will get priority toll-free telephone support Monday through Friday until 11 p.m. Pacific time, an additional three hours beyond the coverage provided by the Apple Assurance program. After hours and on weekends, calls will be returned within 30 minutes.

For additional fees, users can gain one-minute call pick up (ahead of Apple's own System Engineers), status calls about unresolved problems every eight hours and a dedicated account engineer.

Perhaps most importantly, Apple staff will become responsible for problems relating to the integration of Apple products with those of its alliance partners, such as Novell Inc. and Digital Equipment Corp.

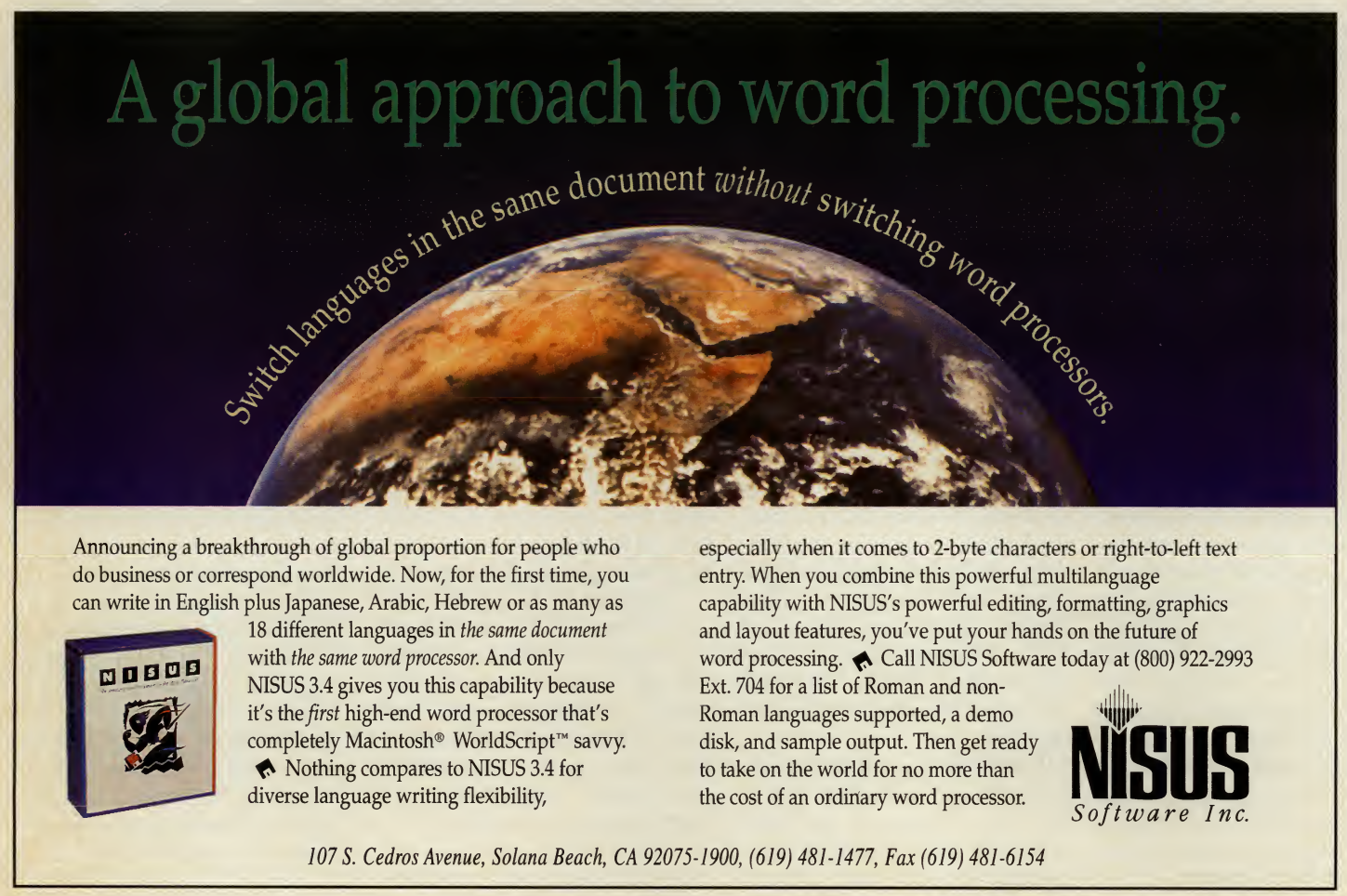
- **Remote briefings.** Desktop briefings will include QuickTime movies. An interactive component will let customers submit questions via electronic mail or fax. Responses will be made via conference calls, which will also be used to announce new products.
- **Training.** Courses designed for information systems professionals will be geared toward the use of Apple products in corporate environments rather than focusing on specific products.
- **Support journal.** A bimonthly publication will cover support issues and offer new-product information and briefing schedules.
- **Infrastructure building tools.** A self-learning application will aid help desk staffs and key users in mastering three levels of competency.
- **Key users.** This program will identify and train key users in workgroups who volunteer to test new products and support their peers.

Apple will package the support tools in single- and multi-user versions, depending on the number of help desk staffers at a location. A package for consultants will offer the same products and services, minus the infrastructure building tools and key user components.

With the introduction of the help desk support program, Apple would join such companies as Microsoft Corp. and Lotus Development Corp. in offering on-site, support databases.

"This is moving Apple in the right direction in terms of letting people be more self-supporting," said Bob Johnson, associated director of Dataquest Worldwide Services Group in Framingham, Mass.

The success of help desk systems depends on the quality of the reference data and the capability of the data search tools. "One of the keys is the extent to which AppleSearch can quickly get users the answers they need," he said. □



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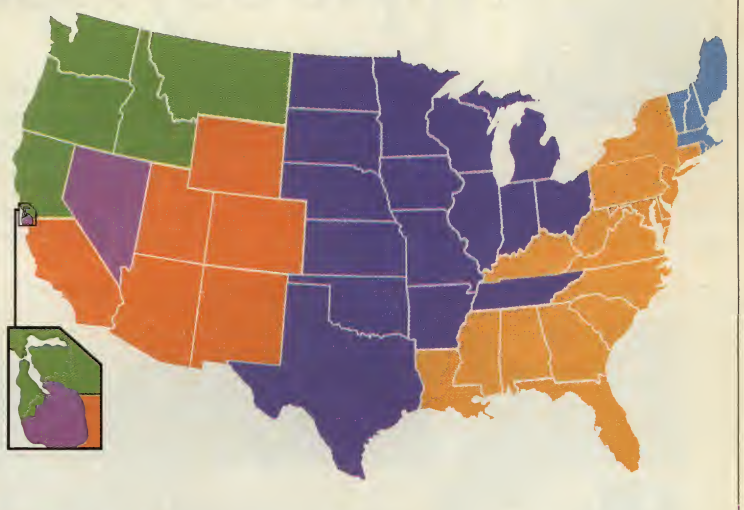

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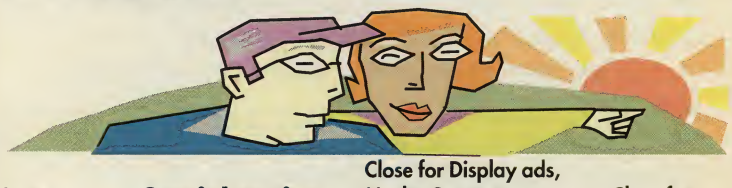

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May 24	**MacWEEK 200** CD-ROM	May 13	May 11
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June 28	Cross-platform tools	June 17	June 15
July 5	Database	June 24	June 22
July 12	Presentations	July 1	June 24

Apple buys speed from 3rd party

All too often the news is flat out scary, as anyone with access to a television news pundit will readily verify. So now you know why we have televised sports, where diversion is guaranteed and there's often the chance of a surprise — like when the boys from L.A. pulled a big one on the Suns, twice. That's the sort of inspiration it takes sometimes to keep the embers of hope glowing.

The twin themes of inspiration and hope are also playing in the corridors Cupertino as Apple enters the final months before the introduction of Cyclone, the 40-MHz '040 multimedia banger. Now comes the Knife's report that seed units have been placed and evaluated at key sites, and the results have proven at least as surprising as the Lakers' dual trashings of the Suns.

Oh, the multimedia types are, for the most part, suitably impressed with Apple's fresh, new CISC Mac. But the graphics and publishing audience greeted the seed units with a collective yawn. What they want more closely resembles a Quadra 950 running at 40 MHz. Although this was a reaction that Apple apparently hadn't anticipated, it managed an astonishingly fleet response.

Since there is no faster version of the 950 in the immediate works (those eggs apparently are stored in the PowerPC basket), Apple tapped into the third-party accelerator and graphics-hardware development community for a solution. The Knife's sources say that by the end of this week Apple will have selected a proposal from one of these companies for a 40-MHz accelerator for the 950. Graphics acceleration will probably be part of the bargain. The unit, which will be the first Apple-logoed accelerator, should be available by September. Change is good. Keep up.

The Cyclone grind. Of course, all those Cyclone goodies that differentiate it from the garden-variety high-end Macs that have come before it do have a certain appeal. There's DSP, for example, which Apple engineers think provides many features that will give the machine a decided advantage in the multimedia hardware marketplace. One faction at Apple, reportedly including John Sculley, is pushing to include a DSP on PowerPC Macs as well. The Knife's sources, however, report that the PowerPC engineering crowd thinks the idea of including DSP is bunk. These scientists say their nascent RISC chip, even in its initial 601 incarnation, can already perform DSP functions, so what's the point? The point, say the DSP proponents, could be to encourage hesitant third parties to commit to DSP development, and thus to improve the Cyclone's prospects in the marketplace.

Battery ultrathin. Most PowerBook users would agree that the ideal battery would weigh next to nothing and provide power for, say, two or three months. We haven't seen one of those yet, but the Knife has heard reports of an external battery pack for 100-series PowerBooks that weighs in at 1.5 pounds, is only about 0.25-inch thick, provides power for six or more hours, and lists for less than $180. The developer, VST Power Systems Inc., expects to make an announcement this week.

And it should continue to be an excellent season to sell batteries as Apple this week plans to announce a stimulus package for the slow-moving PowerBook 165c. The price reduction, expected to be in the range of $400, should help get a few more of these laggards out the door. There may also be a reduction in the price of the 145 to clear inventories prior to the introduction of the upcoming and significantly less costly 145B. The timing and scale of the 145 reduction will mostly depend on the quantities on hand as the June 145B announcement approaches. □

Working undercover for the Knife isn't nearly as risky as writing about playoff games before the series is finished, and it can earn you a MacWEEK mug to boot. Even Phoenix fans can get a hearing at (415) 243-3544, fax (415) 243-3650, MCI (MactheKnife), Internet (mac_the_knife@macweek.ziff.com), AppleLink (MacWEEK) or CompuServe/ZiffNet/Mac.

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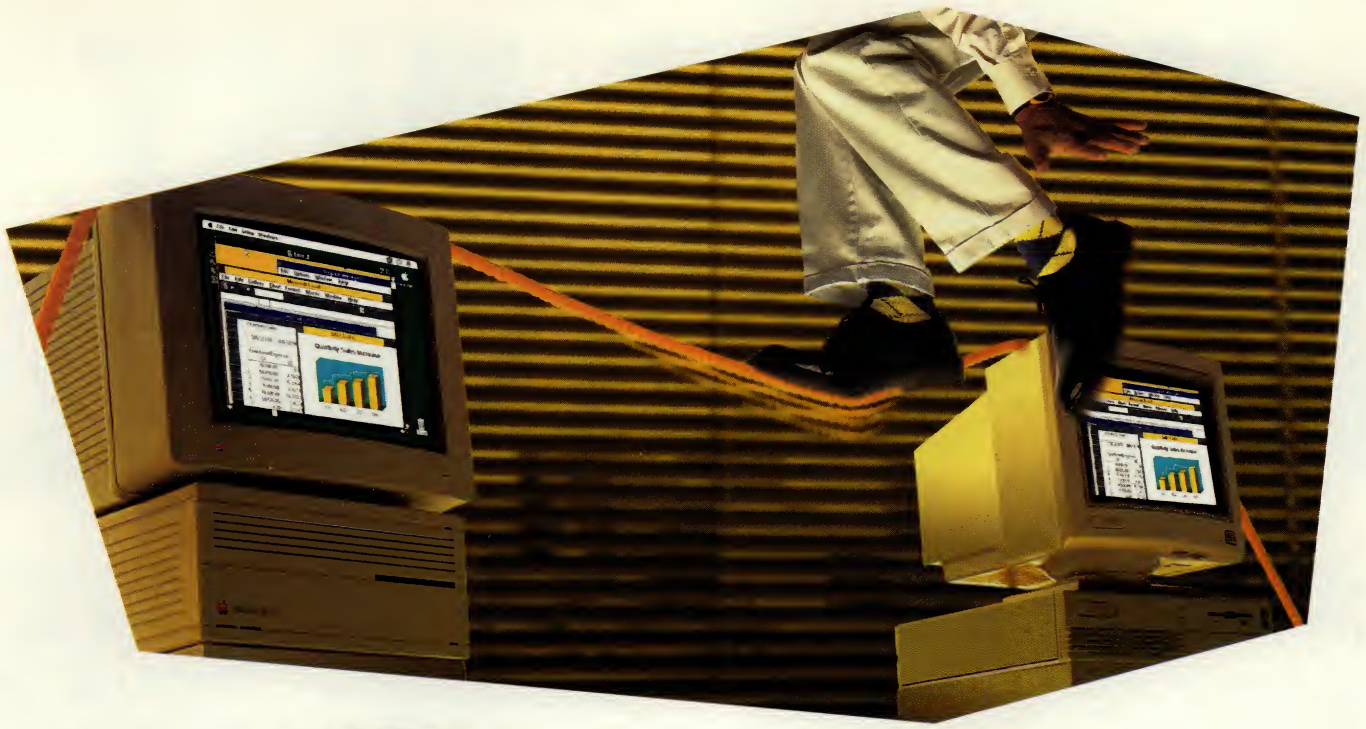

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